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October 16, 2015

Mr. David Bengel
Michigan Department of Technology, Management and Budget
515 Westshire Drive
Lansing, MI 48917

RE: SECOND REVISED CHANGE REQUEST PROPOSAL 020 TO EXTEND THE DATA WAREHOUSE PLATFORM CONTRACT AND PERFORM A HARDWARE REFRESH/FLOORSWEEP UNDER CONTRACT No. 071B1300109

Dear David:

As you know, the State of Michigan (the "State") has made a request for certain changes ("Change Request 020") to Contract 071B1300109 effective November 16, 2010, as amended (the '109 Contract") asking Optum Government Solutions, Inc. ("Optum") to provide a proposal to extend the '109 Contract and perform a Teradata hardware refresh/floorsweep (the "Extension and Floorsweep"). The Extension and Floorsweep constitute "New Work", as that term is defined in the '109 Contract.

In response to this request for Change Request 020, Optum is pleased to provide the State with this Second Revised Change Request Proposal dated October 16, 2015 (the "Change Request Proposal 020") which replaces in whole the original Change Request Proposal 020 dated August 7, 2015 and the Revised Change Request Proposal dated August 17, 2015.

I. Description of the Scope Covered by this Change Request Proposal 020

The hardware, software, and services being offered as part of this Extension and Floorsweep are consistent with the types of services provided during the base 5 year period of the '109 Contract but in so far as the Extension and Floorsweep are outside the scope of Optum's current specific responsibilities defined under the '109 Contract, consistent with the provisions of Section 2.024 of the '109 Contract, the following further describes the new Scope covered by this Change Request Proposal 020.

The State has requested that the '109 Contract be extended by four (4) years by exercising the first and second two (2) year Optional Extension periods per Section 2.002 Options To Renew of the '109 Contract. The current Contract Term End Date of November 15, 2015 will be extended to November 15, 2019 ("Contract Extension Period"). The State has also requested that Optum present optional pricing for the third two (2) year Optional Extension period ("Optional Extension Period").

The Scope of the Contract Extension Period will include a four (4) month Hardware and Software Floorsweep and Implementation Project, from December 1, 2015 through March 31, 2016 along with ongoing maintenance and support for the period of April 1, 2016 through March 31, 2020.

The Scope of the Optional Extension Period will include ongoing hardware, software, subscription, and maintenance services for the period of April 1, 2020 through March 31, 2022.

Following are the Contract modifications, detailed Statements of Work, and additional terms that are integral to this Change Request Proposal 020:

1. Section 1.100 Scope of Work and Deliverables Modifications

Contract section 1.100 – Scope of Work and Deliverables will require certain modifications given the floorsweep hardware refresh and related services definitions that will change as part of the Change Request Proposal 020. Attachment 1 – Section 1.100 Scope of Work and Deliverables Modifications sets forth the modifications and for convenience purposes, Attachment 1 contains an entire restatement of Section 1.100, where Attachment 1 shall supersede and replace the original Section 1.100 as it applies to the Scope of Work and Deliverables under this Change Request Proposal 020 except as set forth in the immediately following sentence. The original section 1.100 will remain applicable as it applies to the Current System until the Current System is De-installed and removed during the month of April 2016.

2. Section 1.200 Roles and Responsibilities Modifications

Contract section 1.200 – Roles and Responsibilities will require certain modifications given the changes that have occurred over the term of the '109 Contract related to named staff. Attachment 2 – Section 1.200 Roles and Responsibilities Modifications sets forth these modifications and for convenience purposes, Attachment 2 contains an entire restatement of Section 1.200, where Attachment 2 shall supersede and replace the original Section 1.200 as it applies to the Scope of Work and Deliverables under this Change Request Proposal 020.

3. Article 2 – Terms and Conditions Modifications

The Contract Article 2 – Terms and Conditions section will require certain modifications in Sections 2.021, 2.022, 2.023, 2.025 and 2.243 given change that have occurred over the term of the '109 Contract. Attachment 3 – Article 2 - Terms and Conditions Modifications sets forth these modifications and for convenience purposes, Attachment 3 contains an entire restatement of those Sections of Article 2, where Attachment 3 shall supersede and replace those Sections from the original Article 2 as it applies to the Scope of Work and Deliverables under this Change Request Proposal 020 except as set forth in the immediately following sentence. The original Article 2, Section 2.243 will remain applicable as it applies to the Current System until the Current System is shut down during the month of March 2016.

4. Floorsweep – Teradata Hardware/Software Refresh and Implementation Services

Optum will perform a Teradata Hardware and Software Floorsweep to replace the existing hardware and software with the new hardware and software configurations as further defined below. Optum will provide professional services to manage the Implementation Services consisting of the following: Project Management, Installation, Data Migration, BAR, Performance and Reporting, Hardening, TASM, De-installation, and Disposal services. Below are more detailed references to each of these services as well as references to attachments which sets forth the hardware, software, and services to be delivered.

- 4.1. Attachment 6 – New Production System Configuration: This Attachment sets forth the detailed Teradata hardware and software components, including part numbers, descriptions, and quantities to be delivered as part of the New Production System.
- 4.2. Attachment 7 – New Development/Disaster Recovery System Configuration: This Attachment sets forth the detailed Teradata hardware and software components, including part numbers, descriptions, and quantities to be delivered as part of the New Dev/DR System.

- 4.3. Attachment 8 – New Test System Configuration: This Attachment sets forth the detailed Teradata hardware and software components, including part numbers, descriptions, and quantities to be delivered as part of the New Test System.
- 4.4. Attachment 9 – System Installation Services Statement of Work: This Attachment sets forth the scope of work and responsibilities included as part of Installation Services where Optum, via our previously approved subcontractor, Teradata Government Systems LLC (“Teradata”) will install the new hardware and software in the State’s Data Centers.
- 4.5. Attachment 10 – Host Group Configuration Services Statement of Work: This Attachment sets forth the scope of work and responsibilities included as part of implementing a 2nd Host Group for the New Production, Dev/DR, and Test Systems.
- 4.6. Attachment 11 – Data Migration Services Statement of Work: This Attachment sets forth the scope of work and responsibilities included as part of Data Migration Services where Optum, via our subcontractor, Teradata, will migrate data from the Current Production Dev/DR, and Test Systems to the corresponding New Production, Dev/DR, and Test Systems in support of the State’s testing and eventual cutover to the New Systems.
- 4.7. Attachment 12 – BAR Services Statement of Work: Optum, via our subcontractor Teradata, will perform Backup, Archive, and Recovery (BAR) Services as set forth in Attachment 12 to install and configure the components necessary to connect the proposed Teradata platforms to the State’s backup services environment for the new Teradata Production, Dev/DR, and Test Systems.
- 4.8. Attachment 13 – De-installation Services Statement of Work: Optum, via our subcontractor Teradata, will perform De-installation Services as set forth in Attachment 14 to disassemble the Current Production, Dev/DR, and Test Systems from the State’s data centers.
- 4.9. Attachment 14 – Disposal Services Statement of Work: Optum, via our subcontractor Teradata, will perform Disposal Services as set forth in Attachment 15 to remove the Current Production, Dev/DR, and Test Systems from the State’s data centers.
- 4.10. Attachment 15 – Hardening Services Statement of Work: Optum, via our subcontractor Teradata, will perform Hardening Services as set forth in Attachment 16 to secure the New Production, Dev/DR, and Test Systems.
- 4.11. Attachment 16 – TASM Update Services Statement of Work: Optum, via our subcontractor Teradata, will perform TASM Update Services as set forth in Attachment 17 to review, update, and monitor TASM Workload Management rules in the New Production, Dev/DR, and Test Systems.
- 4.12. Attachment 17 – Performance and Reporting Services Statement of Work: In support of the State’s requirement in section 1.104.D.7 regarding benchmark testing, Optum, via our subcontractor Teradata, will perform the Performance and Reporting Services as set forth in Attachment 17.
- 4.13. Attachment 30 – Production and Dev/DR Sizing Specifications and Capacity On Demand (“COD”) Increments sets forth the sizing requirements and resulting yearly COD increments.
- 4.14. Attachment 32 – Draft Project Schedule for Implementation: Optum’s Draft Project Schedule is based on similar upgrade and migration projects previously performed at the State of Michigan, as well as experience gained from similar upgrades performed for a number of other state government clients. The draft schedule includes the key tasks associated with implementing the proposed solution as well as the deliverables that will be provided, target dates and durations, and critical paths for the project. Roles and responsibilities and the responsible organizations are included in the draft schedule. The

actual project schedule for implementing the proposed solution will be based on the draft project schedule, subject to any mutually agreed upon amendments between the State and Optum.

5. Ongoing Maintenance

- 5.1. Attachment 18 – Teradata Business Critical ESS Services: As defined in section 1.104.G, Optum, via Teradata, will continue to provide Teradata Business Critical ESS Services along with the Software Implementation option (SWI). Attachment 18 – Teradata Business Critical ESS Services provides additional details regarding the scope and responsibilities of this service offering.
- 5.2. Attachment 20 – Teradata Software Subscription: This attachment details the Teradata software subscription offering and related services.
- 5.3. As an exception to 1.104.A.3, the Teradata Active Data Warehouse Solid State Drives that are included in the Equipment configurations found in Attachments 6 and 7 (“SSD”) will be covered by warranty and maintenance for 6 years as described in Attachment 1, Section 104.A.3, unless, during the sixth year, an SSD has reached its “endurance threshold”. An “endurance threshold” is reached when there is either 0% endurance remaining or when there is 20% or less spare blocks remaining. This exception is a result of the fact that the manufacturer of the SSD does not offer support under such condition. If an SSD fails during the sixth year and has reached its endurance threshold such that it were to require replacement, such replacement would be considered “New Work” and subject to a Change Request Proposal from Optum setting forth the pricing applicable to such a replacement and the State’s acceptance of such Change Request Proposal through the issuance of an additional Change Request that incorporated by reference the Change Request Proposal.

6. BI Query Software Support

Yearly maintenance and support services for the OpenText BI Query Software are included as part of this Change Request Proposal 020. The details of the yearly support services and OpenText BI Query Software are set forth in Attachment 21 – OpenText BI Query Software Support.

7. Optum Symmetry Software License and Support

Yearly licensing and support of Optum Symmetry Software are included as part of this Change Request Proposal 020. The details of the yearly licensing and support for the Optum Symmetry Software are set forth in Attachment 22 – Optum Symmetry Software.

8. TDWI Training Services

Yearly TDWI Training Services are included as part of this Change Request Proposal 020. The details of the yearly TDWI Training Services are set forth in Attachment 31 – TDWI Training Services.

9. Optional Hardware and Software Components

The State has requested that Optum present pricing for several Optional Components as set forth below. The State may choose to exercise these Optional components during the Contract Extension Period and/or Optional Extension Period only through the issuance by Optum of a

Change Request Proposal that provides a more specific description of the Optional Components for which pricing and a high level description of the products or services comprised within the Optional component is set forth below, followed by the State's acceptance of such Change Request Proposal, as evidenced by a Change Request to the '109 Contract and the State's issuance of a corresponding purchase order for the Optional Component.

- 9.1. Protegrity Software to support potential future Data Encryption and Data Masking requirements. Attachment 24 – Optional Protegrity Software, Migration, and Upgrade Services sets forth the Software specifications and pricing as well as the related Protegrity Implementation services Statement of Work. Attachment 25 – Protegrity Gold Support Description sets forth the Protegrity Gold Software Support that is included in the Optional pricing for the Protegrity Software.
- 9.2. Hadoop Infrastructure to support potential future Big Data requirements. Attachment 26 – Optional Hadoop Infrastructure Specifications sets forth the Hadoop Hardware and Software specifications. Attachment 27 – Optional Hadoop Mentoring Services sets forth the mentoring services for the Hadoop infrastructure. Attachment 28 - Optional Hadoop Hardening Services sets forth the hardening services for the Hadoop infrastructure.
- 9.3. Attachment 29 - Optional Unity Server Infrastructure Specifications sets forth the Teradata Unity Servers to support the potential future requirement that QueryGrid be able to access Oracle databases which are external to the Teradata environment.

10. Performance Period For Maintenance and Subscription Services Applicable to the Existing Systems – 1 Month Extension

The period of performance for maintenance services and subscription services in FY16 for the Existing Systems must be extended by 1 month to extend such services to cover the period of March 1, 2016 through March 31, 2016 given that the New System will not be operational until April 1, 2016.

Attachment 1B – Payment Milestones sets forth the revised FY16 payment amounts associated with this 1-month extension.

II. Charges

1. The charges for the 1 Month Extension of the performance period from March 1, 2016 through March 31, 2016 for Maintenance and Subscription Services applicable to the Existing System are included in the revised FY16 amounts set forth in Attachment 1B. If this Change Request Proposal is accepted by the State, as defined below, on or before October 1, 2015, Optum will invoice the State for these charges in advance of the State's Fiscal Year 2016. If this Change Request Proposal 020 is accepted by the State, as defined below, on or after October 1, 2015 but prior to November 1, 2015, Optum will invoice the State for delta between the current FY16 charges set forth in Attachment 1B delivered with Change Request Proposal 019 and those set forth in the revised Attachment 1B attached to this Change Request Proposal 020; i.e., \$165,926) (the "One Month Extension Delta Amount").
2. The State has requested Optum to submit a single invoice to the State for all hardware and software amounts shown in Attachment 4a – Cost Table – 4 year Extension Period for the period from December 1, 2015 through March 31, 2020 (the "Hardware and Software Sub-Total Amount"). Optum will invoice the State for the Hardware and Software Sub-Total Amount upon delivery of New System and after the State selects its third party leasing company for the Hardware and Software Sub-Total Amount, which the State will have completed no later than 60 calendar days after accepting this Change Request 020.
3. Optum will invoice for the various Services for which pricing is set forth in Attachment 4a in the column labeled "FY16 12/1/2015 – 3/31/2016 Implementation" (the "Implementation Related Services Amount"), in accordance with their associated deliverable/milestone achievement.
4. Optum will invoice for recurring Subscription, COD, Services, and Maintenance ordered by the State for which pricing is set forth in Attachment 4a for FY16 – FY20 in advance of the six (6) or twelve (12) month period covered by the subscription, COD, services or maintenance fee, provided that the State has issued one or more purchase order(s) for such recurring subscription, COD, services and maintenance prior to November 1, 2015 for the FY'16 charges (the "Recurring Subscription, COD, Services and Maintenance Amount for FY'16") and prior to the start of each succeeding State Fiscal Year for all other recurring services.
5. For any of the optional hardware, software, or services set forth in Attachment 5 – Optional Components Cost Tables, ordered by the State, Optum will invoice the corresponding fee upon delivery to the State, as will be set forth in more detail in Change Request Proposals that would cover the Optional Component(s).

III. Terms by Which the State May Accept This Change Request Proposal 020 for Extension and Floorsweep

The State can approve this Change Request Proposal 020 by issuing (1) a Change Notice that references this Change Request Proposal 020 and (2) the related Purchase Orders for (a) the applicable amount for Maintenance and Subscription Services applicable to the Existing System through March 31, 2016, (b) the Hardware and Software Sub-Total Amount, (c) the Implementation Services Amount and (d) the Recurring Subscription, COD, Services and Maintenance Amount for FY'16, all of which must be received no later than November 1, 2015.

IV. General

Except as expressly amended by this Change Request 020, all other terms and conditions of the '109 Contract remain in effect.

Should you have any questions, please do not hesitate to contact me. Thank you again for the opportunity to work with you and your project team.

Sincerely,



Point of Contact:

David Wieber
Michigan Director of Operations
Optum Government Solutions


Jean Benson (Oct 20, 2015)

Authorized Signer:

Jean Benson
Vice President, Finance
Optum Government Solutions, Inc.

Attachment 1

Section 1.100 Scope of Work and Deliverables Modifications

1.100 SCOPE OF WORK AND DELIVERABLES

1.101 IN SCOPE

Platform Hardware/Software Acquisition: Optum Government Solutions, Inc. ("Optum" or the "Contactor") will acquire, sell, license, deliver and assist with the installation and implementation of all Data Warehouse products procured through this Contract. For purposes of this Contract, the following definitions shall apply to the "Data Warehouse products" or "System" that is considered as part of the in scope work:

1. "New Data Warehouse products" or "New System" or "New Platform" or "New Production, Dev/DR, and Test System" means the New Production System, the New Dev/DR System, and the New Test System.
2. "New Production System" means the Equipment and Software described in Attachment 6.
3. "New Dev/DR System" means the Equipment and Software described in Attachment 7.
4. "New Test System" means the Equipment and Software described in Attachment 8.
5. "Equipment" or "Hardware" means the hardware components comprising the New Production System, New Dev/DR System, and New Test System.
6. "Software" means the computer programs in object code format only, comprising the New Production System, New Dev/DR System, and New Test System.
7. "Current Production System" shall mean the Customer's existing 3+2 Five (5) Node Teradata 5650 system identified by SITEID: HX0528.
8. "Current Dev/DR System" shall mean the Customer's existing 2+1 three (3) Node Teradata 5650 system identified by SITEID: HX0531.
9. "Current Test System" shall mean the Customer's existing one (1) Node Teradata 560 Test Dual Active system identified by SITEID: HX0532.
10. "Current Data Warehouse products" or "Current System" or "Current Platform" or "Current Production, Dev/DR, and Test Systems" means the Current Production System, the Current Dev/DR System, and the Current Test System.

The State must approve the installation plan. The State will provide all hardware racking infrastructure, including server racks, Keyboard, Video, Mouse (KVM), network switches, routers, etc. that is not otherwise included in Attachment 6, 7 and 8.

Storage and Backup: the Contractor will integrate the System into the State's Enterprise Backup and Recovery service.

Installation: Working with the Department of Technology, Management and Budget (DTMB) Data Center Operations (DCO), Technical Services, Network and Telecommunications Services (NTS) and the Michigan Cyber Security (MCS), the Contractor will work with the State to harden the New System to meet the State's defined operational and security requirements.

Migration: Once the System is installed, configured, and operational, the Contractor will work with Data Center Operations (DCO) and each user agency to migrate the data from the Current System using the Teradata NPARC data migration product and services.

Additional Analytical Software may be added over the life of this Contract: at the State's request, the Contactor will utilize the Contract Change Management process to add the software solutions for which pricing is set forth in Attachment 5 to this Contract.

Additional Data Warehouse Hardware, Software and Related Services may be added over the life of this Contract: at the State's request, the Contactor will utilize the Contract Change Management process to add the Data Warehouse hardware, software and related services for which pricing is set forth in Attachment 5 to this Contract.

A more detailed description of the hardware, software, services (work), and deliverables included in this Contract is provided in Article 1, Section 1.104, Work and Deliverables.

1.102 OUT OF SCOPE DELETED NA

1.103 ENVIRONMENT

The links below provide information on the State's Enterprise IT policies, standards and procedures which includes security policy and procedures, IT strategic plan, eMichigan web development and the State Unified Information Technology Environment (SUITE).

All services and products provided in this Contract must comply with all applicable State IT policies and standards. The Contractor must request any exception to State IT policies and standards in accordance with the State's processes. The State may deny the exception request or seek a policy or standards exception.

Enterprise IT Policies, Standards and Procedures:

<http://www.michigan.gov/dit/0,1607,7-139-34305---,00.html>

All software and hardware items provided by the Contractor must run on and be compatible with the State's Standard Information Technology Environment. Additionally, the State must be able to maintain software and other items produced as the result of the Contract. Therefore, non-standard development tools may not be used unless approved by the State. The Contractor must request, in writing, approval to use non-standard software development tools, providing justification for the requested change and all costs associated with any change. The State's Project Manager and DTMB must approve any tools, in writing, before use on any information technology project.

It is recognized that technology changes rapidly. The Contractor may request, in writing, a change in the standard environment, providing justification for the requested change and all costs associated with any change. The State's Project Manager must approve any changes, in writing, and DTMB, before work may proceed based on the changed environment.

Enterprise IT Security Policy and Procedures:

All computer information systems and applications operate in a secure manner and comply with State Enterprise IT Security Policy and Procedures as found on the website:

<http://www.michigan.gov/dit/0,1607,7-139-34305-108216--,00.html>

The State's security environment includes:

- DTMB Single Login.

- DTMB provided SQL security database.

- Secured Socket Layers.

- SecurID (State Security Standard for external network access and high risk Web systems)

IT Strategic Plan:

<http://www.michigan.gov/dit/0,1607,7-139-30637-135173--,00.html>

IT eMichigan Web Development Standard Tools:

http://www.michigan.gov/documents/Look_and_Feel_Standards_2006_v3_166408_7.pdf

The State Unified Information Technology Environment (SUITE):

Includes standards for project management, systems engineering, and associated forms and templates – must be followed: <http://www.michigan.gov/suite>

Agency Specific Technical Environment

The agencies that use the Enterprise Data Warehouse use a range of databases and operating systems including Oracle on HP/UX, Solaris on Windows, SQL/Server on Windows and My SQL on Linux. All of these environments must be able to directly access data on the New System and must be able to feed data to the Data Warehouse.

The State supports a common Business Objects reporting/query system that is used by several agencies to access the Data Warehouse. Several of the Agencies also use BI Query to access the Data Warehouse. Both of these query/reporting solutions must be able to access the Data Warehouse.

1.104 WORK AND DELIVERABLES

A. General Platform Requirements

1. All dates and schedules related to delivery, installation, migration, testing, acceptance and operations of the Systems shall be captured in the project schedule and subject to mutual agreement between the State and Contractor. The State shall order the System and related services from Contractor that are shown in Attachment 4a Cost Table – 4 year Extension Period for the period from December 1, 2015 through March 31, 2020 no later than November 1, 2015 and if Contractor is able to deliver such products on or before December 31, 2015, the State shall accept such delivery by that date.
2. The New Production System that is delivered must support the current widely mixed workload along with the anticipated 12.5% year over year growth in data and processing power with exception of the 6th year of this extended agreement where it is already known that the refreshed hardware will not meet the 12.5% per year growth requirement. In addition, Contractor must provide necessary supporting services including:
 - Data migration from the Current System;
 - Training for administrators, developers and end users to most effectively use the capabilities of the New System; and
 - Installation and configuration services.
3. The Equipment and Software must have at least six (6) years of support available from the manufacturer to cover the 1st, 2nd, and 3rd two (2) year Optional Extension periods.

B. Hardware Requirements

1. Hardware to be provided is a production solution (i.e., New Production System), a separate development/disaster recovery (DR) solution (i.e., New Dev/DR System), and a separate Test solution (i.e., New Test System). The New Dev/DR System must be technically the same architecture as the New Production System but sized to be at least 2/3 the capacity of the New Production System.

2. The New Production System must perform tasks, using a widely mixed workload of tactical and strategic queries and load, for the next six years to provide equal or better performance than the Current Production System and must be linearly scalable to accommodate the projected growth of 12.5% year over year in both data and processing demand where it is already known that the refreshed hardware will not meet the 12.5% per year growth requirement in the sixth year. (See Attachment 29 – Production and Dev/DR Sizing Specifications).
3. The New Production System must be highly available with redundant internal components for automatic and seamless failover. The New Production System must maintain 99.75 percent availability, to be measured by the Contractor via metrics on a monthly basis, with the exception of scheduled maintenance windows. The metric report must be delivered to the State DCO on a monthly basis. The New Production System must also be configured to utilize the State's enterprise Netbackup backup solution.

The New Dev/DR System must be highly available with redundant internal components for automatic and seamless failover. The New Dev/DR System must maintain 99.50 percent availability, to be measured by the Contractor via metrics on a monthly basis, with the exception of scheduled maintenance windows. The metric report must be delivered to the State DCO on a monthly basis. The New Dev/DR System must also be configured to utilize the State's enterprise Netbackup backup solution.

4. The New Systems must be configured to connect to the State's network with redundant 10GbE Fiber Network interface connectors which are capable to step down to a 1 GbE Network.
5. Contractor must provide all necessary hosting center hardware to support Console operations for the purposes on on-site software administration and/or the monitoring of the New System.
6. The Equipment must include climate saving features, and must be configured for redundancy and resiliency and standardized in the State's hosting and remote environments. The Equipment must be architected in an energy efficient manner.
7. The Equipment must also take advantage of the State's hosting center Uninterruptable Power Systems (UPS) environment and not be configured with any standalone UPS's.
8. Contractor will provide a New Production System consisting of five (5) servers:
 - Three (3) Teradata 6800-H nodes (two (2) nodes and one (1) hot-standby node (HSN));
 - One (1) TMS Viewpoint Managed Server; and
 - One (1) VMS SWS/CMIC Managed Server.
9. Contractor will provide a New Dev/DR System consisting of five (5) servers:
 - Three (3) Teradata 6800-H nodes (two (2) nodes and one (1) hot-standby node (HSN));
 - One (1) TMS Viewpoint Managed Server; and
 - One (1) VMS SWS/CMIC Managed Server.
10. Contractor will provide a New Test System consisting of three (3) servers:
 - Two (2) Teradata 2800 nodes;
 - One (1) VMS SWS/CMIC Managed Server.

11. Specifications for the New System will consist of the following:

Metric Quick Reference			
Component	Production System	Development/DR System	Test System
Model Number	6800-H	6800-H	2800
Configuration	Capacity	Capacity	Capacity
Database Version	Teradata 15.10;	Teradata 15.10	Teradata 15.10
Operating System	SLES 11	SLES 11	SLES 11
Number of Nodes	2	2	2
Number of Hot Standby Nodes	1	1	0
Tperf per Node	299	299	NA
Total TPerf*	598	598	NA
Number of SSD Drives Per Node	8-40; 16 currently configured	8-40; 16 currently configured	NA
Total Number of SSD Drives	16-80; 32 currently configured	16-80; 32 currently configured	NA
Number of HDD Drives Per Node	72-168; 168 currently configured	72-168; 144 currently configured	40
Total Number of HDD Drives	144-336; 336 currently configured	144-336; 288 currently configured	80
Disk Size SSD (in GB)	1600	1600	NA
Disk Size HDD (in GB)	300,600; 300 GB HDD's are used here	300,600; 300 GB HDD's are used here	300, 600, 900, or 1,200. 900 GB HDD's are used here.
Max Perm (in TB)	23.0 TB @ 50% COD; 46.4 TB @ 100% COD	18.4 TB @ 50% COD; 40.2 TB @ 100% COD	32.9
Current Perm Threshold(in TB)	35.7 TB	30.9 TB	24.3
Customer Data Space (in TB)	29.7 TB	25.8 TB	43.8 TB @ 66.7% compression with automatic block level compression
Raid Configuration	1	1	1
Memory per Node/GB	512 DDR4	512 DDR4	512 DDR4
Amps/Node	Configurable; 36 configured;	Configurable; 36 configured;	Configurable; 40 configured;
Parsing Engines/Node	2 (std), configurable	2 (std), configurable	2 (std), configurable
Processor	Dual 14 Core Haswell	Dual 14 Core Haswell	Dual 14 Core Haswell
* The Total TPerf numbers are the maximum TPerf available on the platform			

12. Attachment 6 contains a detailed list of all Equipment and Software components required that Contractor will provide for the New Production System. Attachment 7 contains a detailed list of all Equipment and Software components that Contractor will provide for the New Dev/DR System. Attachment 8 contains a detailed list of all Equipment and Software components that Contractor will provide for the New Test System.

C. Software Requirements

1. If ordered by the State, Contractor shall provide software in the following categories:
 - Operating system software;
 - Data warehouse optimized Database Management System software (DBMS);
 - Administrative software;
 - Query software;
 - Backup and Restore software;
 - (Optionally) analytics software; and
 - (Optionally) Data Warehouse support software.
2. The Data Warehouse optimized Database Management System (DBMS) software must be specialized to enable fast and flexible Data Warehouse designs with both dimensional and normalized models. The proposed software must be the most current, stable, release. The software must support ANSI 98 with analytic extensions. The system software must support callable functions that handle common database processing faculties which can be created or modified by developers. The DBMS must support role-based security. It must support the State's internal chargeback methodology by providing a mechanism that assigns databases and users to their respective agencies and provides for the tracking of disk storage usage and processor utilization. The logging of all queries on the system with their performance metrics and origination information must be supported. The DBMS must be capable of Workload Management functions, including the ability to define distinct operating time frames, query prioritization based on user groups and workloads and system performance standards. The System must support encryption of data at rest.
3. The State has a substantial investment in Geographic Information Systems (particularly with ESRI software) and has implemented them in multiple agencies. In the past it has required some complex workarounds to integrate the Data Warehouse with these systems. As such the DBMS must provide support for Geographical objects and services including points, regions, and geo-coding.
4. The administrative software must support monitoring and management to allow the State database administrators (DBAs) to manage the performance of the Data Warehouse and ensure that high priority queries are completed in acceptable times, while allowing lower priority queries and loads to complete as required. The software must provide the ability to define operating time frames, workloads and assign priority levels. The New System monitoring software must provide a near real-time picture of database operations with the ability to manually attend to poorly performing processes. The system monitoring software must also provide the ability to set up alerts based on system conditions.
5. Query software must direct access to the warehouse for executing SQL queries.
6. All Data Warehouse basic query, GIS, and monitoring tools must be provided with an enterprise site license so that any State user (DBA in the case of the monitoring tools) can have access to them.
7. Contractor must provide Load and Unload Utilities, including a natively supported utility capable of network traffic encryption that can be leveraged by IBM DataStage.
8. Contractor must provide a software subscription to all current and future supported versions of the Database System Software, the Operating System, the Load and Unload Utilities, the backup and restore software and any extensions/plugin-ins and provided software.

9. The New System must be compatible with existing State tools (any adapters required for interoperability with this software must be included in the price) including:
 - Extraction/Transformation and Load (ETL): IBM DataStage;
 - Reporting: SAP Business Objects and OpenText BI Query; and
 - Existing State COTS products such as Treasury's ESKORT, (see Attachment B of the RFP for details)
10. The New System must be able to communicate via a natively supported protocol, JDBC, ODBC, and OLE-DB.
11. The New System must contain a full suite of utilities for loading data to the Data Warehouse including a mechanism to add new data in small amounts throughout the day (e.g., Teradata TPump).
12. The New System must include all Software and operating system installation and configuration for the New Production, Dev/DR, and Test Systems.
13. The solution must include Teradata Warehouse Miner (Analytic Software).
14. Contractor will provide all operating system software, Teradata Database software, Teradata Tools and Utilities including Teradata Parallel Transporter software, and Viewpoint software as defined in Attachment 6, Attachment 7, and Attachment 8.
15. Contractor will provide Teradata Database Release 15.10, or as mutually agreed upon by the State and Contractor.
16. The New System must have the capability to enable Capacity on Demand capabilities.
17. Contractor will provide software subscriptions for all provided Teradata Software.
18. Contractor will provide reference manuals for all Hardware and Software via on-line access. Documentation is available for download at: <http://www.info.teradata.com/>.
19. Contractor will provide the State with access to Teradata's customer web site, Teradata @ Your Service, through a specified contract number.
20. Contractor will provide Netbackup extensions to utilize the State's Enterprise BackUp and Recovery solution.

D. Implementation and Migration Requirements

1. Acceptance criteria related to the migration of data to the New Production, Dev/DR, and Test Systems and for final acceptance of the New Production, Dev/DR, and Test Systems shall be mutually agreed upon between the State and Contractor.
2. Contractor must implement the New Production System. Implementation consists of installing (at the State's site) and configuring the New Production System and migrating the databases from the Current Production System 5650-H Data Warehouse to the New Production System. Upon the successful completion of the second NPARC to the New Production System, and at a time as will be mutually agreed upon by the State and Contractor, Contractor will decommission the Current Production System 5650-H per the State – Secure Disposal of Installed and Removable Digital Media policy.
3. Contractor must implement the New Dev/DR System. Implementation consists of installing (at the State's site) and configuring the New Dev/DR System and migrating the databases from the Current Dev/DR System 5650-H Data Warehouse to the New Dev/DR System for formal acceptance testing. Upon the successful completion of the second NPARC to the New Dev/DR System, and at a time as will be mutually agreed upon by the State and Contractor, Contractor will decommission the Current Dev/DR System 5650-H per the State – Secure Disposal of Installed and Removable Digital Media policy.

4. Contractor must implement the New Test System. Implementation consists of installing (at the State's site) and configuring the New Test System and migrating the databases from the Current Test System 560 Data Warehouse to the New Test System for formal acceptance testing. Upon the successful completion of the second NPARC to the New Test System, and at a time as will be mutually agreed upon by the State and Contractor, Contractor will decommission the Current Test System 560 per the State – Secure Disposal of Installed and Removable Digital Media policy.
5. Contractor will work with the State to configure the connection to the network interface on the New Production, Dev/DR, and Test Systems to the State's backup solution.
6. Contractor will provide staff to manage the implementation process including a Project Manager with at least three (3) years of system implementation/migration experience and a support crew of experienced professionals.
7. Testing will be in two phases.
 - The first phase is a benchmark/Proof-of-Concept test so that the New Production System can successfully manage the expected mix of queries, loads and applications that will be seen in production. To do this the State will execute a script to simulate a heavy day's activity on the Current Production System - Data Warehouse. Data from the Current Production System will be provided to Contractor and must be loaded (without change to the current schemas) on the New Production System for the test. Performance on the New Production System must match or exceed the performance on the Current Production System.
 - The second phase of testing will be part of the systems conversion process in which each converted system must pass system tests, parallel tests and load tests to ensure that they will provide the State with correct results with the same or improved functionality and performance. Contractor will work with the State to develop and run the tests. If the results are not correct or if the performance of the processes does not meet requirements of the Contract, Contractor will be required to correct the problems.
8. Contractor will provide installation, and implementation services of Netbackup software and extensions.
9. Contractor will develop a project plan to order, stage and receive all ordered Software and Hardware for the New Production, Dev/DR and Test Systems (and any other ordered software that may not be part of the New System (e.g., Teradata Warehouse Miner)).
10. The State will be responsible for all site preparations including all required Hardware placement, any racking not included in this Contract, network connections and patch panels, floor reinforcing and electrical connections.
11. The State will receive all Hardware and Software components for the New Production, Dev/DR, and Test Systems at their respective hosting center sites.
12. Contractor, through its subcontractor, Teradata, will uncrate and unpack all Hardware and Software components, inventory all Hardware and Software components and determine if all required components have been shipped. Contractor will position the Hardware in the areas determined and prepared by the State. Teradata Customer Service Representatives will install and configure the Hardware, perform all required system preparations and testing, install the operating system and database management system, including the most current patch releases. These tasks will be performed for the New Production, Dev/DR and Test Systems. Capacity-on-Demand software will be configured appropriately as defined in Attachment 6 for the New Production System, Attachment 7 for the New Dev/DR System, and Attachment 8 for the New Test System. Appropriate changes will be made on an annual basis to maintain the Capacity-on-Demand configuration in order to meet the 12.5% annual compound growth requirement.

13. Once the New Production System is installed and available for testing by the State, a benchmark will be performed by State representatives prior to the first data and object migration (the "Proof-of-Concept").
14. Following the Proof-of-Concept, the first data and object migration from the Current Production System to the New Production System will be performed by Teradata representatives. Testing by State representatives will follow for a period to be determined by the mutual agreement of the State and Contractor.
15. Teradata representatives will review State requirements and work with the State to finalize the hardening of the operating systems of the New Production, Dev/DR, and Test Systems to State and Federal Audit Standards (in accordance with the most current IRS OS SCSEM) shortly following the first migration for each New System. Upon the completion of the hardening process, the State will execute vulnerability scans against all nodes and servers until they pass and Contractor will work with the State to resolve any identified issues. This process applies to the New Production, Dev/DR, and Test Systems.
16. Following an acceptable period of testing, a second migration of data and objects will be performed by Teradata representatives. A go-no go decision to determine if the New Production System is operational will be made after the second migration and a short period of testing.
17. The State and Contractor will mutually agree as to a time period during which the Current Production System will remain available as a fallback option after the second migration and the start of production processing on the New Production System.
18. By mutual agreement between the State and Contractor, the implementation services related to the migration of data and objects from the Current Dev/DR System to the New Dev/DR System may commence either following first the migration period on the New Production System or following the final migration.
19. At a time as defined in the mutually agreed upon project plan, the first data and object migration from the Current Dev/DR System to the New Dev/DR System will be performed by Teradata representatives. Testing by State representatives will follow for a period to be determined by the mutual agreement of the State and Contractor.
20. Following an acceptable period of testing, a second migration of data and objects will be performed by Teradata representatives. A go-no go decision to determine if the New Dev/DR System is operational will be made after the second migration and a short period of testing.
21. The State and Contractor will mutually agree as to a time period during which the Current Dev/DR System will remain available as a fallback option after the second migration and the start of processing on the New Dev/DR System.
22. At a time as defined in the mutually agreed upon project plan, the first data and object migration from the Current Test System to the New Test System will be performed by Teradata representatives. Testing by State representatives will follow for a period to be determined by the mutual agreement of the State and Contractor.
23. Following an acceptable period of testing, a second migration of data and objects will be performed by Teradata representatives. A go-no go decision to determine if the New Test System is operational will be made after the second migration and a short period of testing.
24. The State and Contractor will mutually agree as to a time period during which the Current Test System will remain available as a fallback option after the second migration and the start of processing on the New Test System.

E. Training Requirements

1. The Contractor must provide training to allow the State to fully maintain, and expand the Data Warehouse, databases on the Data Warehouse, security, and queries that access the Data Warehouse.
2. The State will supply any required facilities, but classes may also be held in the Contractor's Lansing, MI area facility, if available. Contractor will pay for the trainer's travel.
3. In addition to the initial training, the Contractor must provide sufficient credits to allow up to 10 staff members a year to train in administrative, development, or designer topics through the life of the Contract.
4. The Contractor must provide train the trainer classes to enable the State to train end user, analysts, and developers in the future.
5. Upgrades and new versions to the system that affect end-user functionality must include training at no additional cost (e.g., classroom or online training, training flier, release features, etc.).
6. The Contractor must develop and provide all training manuals, training plans and other documentation for training classes. All training materials provided become the property of the State.
7. Contractor will utilize Teradata's Customer Education organization to provide most of the required Teradata training and will use Contractor and other subcontractor services as required to provide the remaining training services. The training will include a combination of web technology through the Teradata Education Network, along with hands-on classroom training.

Contractor will provide the following training:

1. Teradata Education Network Plus - Contractor will provide annual memberships throughout the four (4) year term of the 1st and 2nd Optional Extensions as well as the two (2) years included as part of 3rd two (2) year Optional Extension period. to the Teradata Education Network Plus (TEN+) for up to ten (10) State staff (e.g., System Administrators). The TEN+ Membership will be provided as a State group Membership and one member of the State team will be provided with Membership authorization and tracking capabilities. Each individual Membership (i.e., one (1) member of the total allotted ten (10) members) will be assigned to a named staff member, assigned at the option of the State. Should there be a change in job assignments that requires a subsequent reassignment of the TEN+ named user access during the first six (6) months of each annual term of the TEN+ Membership, such changes may be made by the State at no additional cost. Changes in the named user access cannot be made during the last six (6) months of any annual term of the TEN+ Membership.
2. Teradata Partners Conference - The Contractor will provide conference passes for up to three (3) State staff to attend the Teradata Partners Conference each year during the four (4) year term of the 1st and 2nd Optional Extensions as well as the two (2) years included as part of 3rd two (2) year Optional Extension period. The State will be responsible for travel and lodging costs associated with the conference.
3. On-Site Customized Classes - The Contractor will provide On-site customized training for up to Twelve (12) days of on-site Teradata classes at a State site for up to twelve (12) students per class during the four (4) year term of the 1st and 2nd Optional Extensions as well as the two (2) years included as part of the 3rd two (2) year Optional Extension period. The curriculum for these classes can be in any subject area that Teradata has in their curriculum and the Contractor will work with the State to select and create a customized curriculum that best meets its needs, when it need the training. The on-site training will be delivered at a State or a Contractor facility in the Lansing, Michigan area as may be mutually agreed with the State.

F. Documentation Requirements

The Contractor must supply documentation for each area of its products including the Data Warehouse hardware and software, containing sufficient information for DCO staff to manage and maintain the New System. In addition, the Contractor will provide documentation intended for usage by developers and end users who design databases, queries, and applications that run on the New System.

1. New System Documentation:
 - a. Contractor will provide two (2) electronic copies as well as access to the **Platform User and Technical Manuals** online at the Teradata Information Products Web site.
 - b. Contractor will provide two (2) electronic copies as well as access to the **Platform Operations Manual** online at the Teradata Information Products Web site.
 - c. Contractor will provide the State with access to **all updates of documentation** during the term of the Contract through the Teradata Information Products web site.
 - d. Contractor will provide access to **SQL documentation** through the Teradata Information Products web site.
 - e. Contractor will provide ODBC and JDBC driver **interfacing requirements documentation** for third party tools and in-house applications through the Teradata Information Products web site.
2. The following documentation will be provided for all modules and program development:

Note: The Contractor's solution does not necessitate the need for, nor include, any application conversion or program development, so it is not expected that any of the following documentation deliverables will be required. The documentation noted below has, however, been included in the Contract to cover any such future conversion or development that the Contractor determines to be required during the project

 - a. System-wide documentation and specifications
 - b. Baseline End-User training manuals to be used as a basis for "User Manuals" and online help
 - c. Installation procedure
 - d. Module configuration documents sufficient for configuration maintenance purposes
 - e. Testing scripts
 - f. Specification documentation
 - g. Production migration
3. The Contractor will provide access to all documentation and manuals provided online by Teradata at the Teradata Information Products web site. The use of the hardware/software will be detailed in the documentation such that resolution of most problems can be determined from the documentation, and most questions can be answered from a review of such documentation.
4. All system, operational, user, change, and issue documentation must be available in electronic format, published to an intranet website, accessible to State users, updated regularly, with unique numerical identifiers for each section and will be consistent with the most current version of the application(s) and three (3) previous versions.
5. Contractor will work with the State to organize the system, operations, user, change and issue documentation in a format and manner that is approved by the State and in a manner that facilitates updating and allowing for revisions to the documentation to be clearly identified including the three (3) previous versions.
6. The Contractor will provide the State for their review and approval, complete, accurate, and timely system, operations, user change and issue documentation. Drafts will be made available to the State within sixty (60) days of hardware installation of the New System and final versions will be available prior to acceptance of the New System by the State. The Contractor will work closely with the State to provide the required number of copies of the documentation and to implement a process to maintain an

organized set of documents in a manner as agreed upon with the State. The Contractor will supplement the documentation with change and issue documentation specific to the State's implementation, and as agreed upon with the State. The Contractor will work with the State to review the change and issue documentations as a starting point and modify the documentation as may be agreed upon. The Contractor will maintain the documentation throughout the term of the Contract.

7. The Contractor will notify the State of any discrepancies or errors outlined in the system, operations user, change and issue documentation on a monthly basis, or as the information becomes available (based on the severity of the discrepancy or error). The Teradata Customer Services representative are routinely notified of system-related issues and will provide the State with required updates and notices as the information becomes available.
8. The Contractor will provide the State with documentation for any newer software version in advance of the installation of the updated software. All Teradata manuals are available at the Teradata Information Products Web site and can be viewed at any time.

G. Warranty, Maintenance, and Support Services Requirements

DCO shall have the exclusive authority to request Teradata maintenance services. Contractor or its Subcontractor, Teradata, shall NOT respond to calls for service from any other source without prior written approval of the DCO Contract Administrator.

1. Technical Support Services

- a. All onsite support personnel must be certified by Contractor to support the Data Warehouse hardware and software. The on-site support personnel will have to pass the Michigan State Police background check process and may be fingerprinted for access to a Secure State facility before the Contractor will be allowed on-site. Proof of certification must be provided to the DCO Contract Administrator.
- b. The Contractor will provide the Teradata Business Critical Enterprise System Support (ESS) Services which includes:
 - Providing a toll free phone number, available 7 x 24 x 365 including State holidays and weekends
 - Making available unlimited technical telephone support for the State to place trouble calls for the System
 - Logging of all State trouble calls
 - Responding to and initiating a diagnosis of the reported issue for all Priority 1 calls within 30 minutes of the call or ticket submission. For purposes of this Contract, the following definitions shall apply to the priorities to be assigned to a call or ticket submission:
 1. Priority 1: Urgent (Critical) – A problem that prohibits use of the product or renders the product inoperable. Immediate and unrestricted access must be given to the New System.
 2. Priority 2: High (Significant) – A problem that causes a significant impact to the business. No acceptable workaround is available. However, operations can continue in a degraded fashion.
 3. Priority 3: Medium (Minor) – A problem that negligibly impacts your ability to do business. These calls also include current product and services usage questions and questions about installation.

- Providing the State a documented escalation process to senior technical/engineering staff or Management when repair services are not meeting the needs of the State.

2. Warranty Services:

Contractor will provide the Teradata Business Critical ESS Services for the New Systems which includes:

- 7x 24 x 365 hardware warranty services
- If it is determined that the problem requires on-site support for repair, Teradata will dispatch a service representative to provide on-Site support within two (2) hours of dispatch (including State Holidays). The figure below identifies the Teradata Business Critical ESS Service response times based on the priority level of the incident.

	Coverage Hrs		P1-Response		P2-Response		P3-Response	
Service Level	On-Site	Remote	On-Site	Remote	On-Site	Remote	On-Site	Remote
Bus. Critical	7x24	7x24	2 hr	30 min	4 hr	30 min	4 hr	30 min

- The Contractor will provide a one (1) year warranty for all equipment parts, hardware and software services. The 1-year warranty period will begin upon receipt of the New Systems by the State and will include on-site parts, all labor and expenses, and on-site assembly and installation.

3. Maintenance and Repair Services

- Contractor must provide preventive maintenance, including, but not limited to, repairing hardware and/or software and inspection, adjustment and testing (furnished on a scheduled basis), in accordance with the Teradata Business Critical ESS Service.
 - All maintenance, (security and bug-fix) patches, and software upgrades shall be scheduled at a mutually agreed upon time and approved by the State's Enterprise Change board.
 - There will be a dedicated maintenance window Sundays between 4 p.m. and 11:59 p.m. EST.
- Secure remote diagnostic capabilities, monitoring tools and electronic fault notification must be provided at no additional cost to the State via the Teradata Business Critical ESS Service.
- The Contractor will provide a Teradata Software Upgrade Subscription for the New Production, Dev/DR, and Test Systems. This Subscription service will be provided to the State throughout the term of the Contract, at the rates included in Attachment 4. All patch upgrades must be certified. Software maintenance will commence after the end of the warranty period.
- The Contractor will provide, and our associated pricing includes, on-site parts replacement, all labor and expenses to install parts on-site and the services required to restore the system to an operational mode. The manufacturer's hardware maintenance offering does not include restoration of data as part of that service. However, the Contractor will use reasonable efforts to assist the State with data related issues that arise as a result of the Contractor's actions. All parts will be certified as defect free, and new (not refurbished), as long as they are available from the manufacturer. Due to product cycles, however, there may come a time in the contract life of the New System that new parts are no longer manufactured or available. In that case, the Contractor

may use parts that are certified as defect free but not new. Hardware maintenance will commence after the end of the warranty period.

- e. The Contractor will be responsible for meeting with the State at least once each month to advise the State on matters or issues of relevance to the New System. Its subcontractor, Teradata, may also participate by sending one or more representatives. Discussion items will include:

- System Operational status,

In the monthly meetings, the Contractor will provide various operational status reports, including a Service Performance and availability Report for the New Production, Dev/DR, and Test Systems. This report will document the Contractor's responsiveness to all incidents reported to a Teradata Managed Services Center during the quarter compared to your contracted guidelines. The reports will provide statistics for incidents opened and closed during the reporting period.

On an annual basis, the Contractor will schedule an annual Executive level meeting. The Contractor's support team will review the effectiveness of the support services, and how it will support any planned system enhancements. Additionally, the Contractor will review the Service Performance Reports and the impact of these on system availability as reported in the System Availability Reports. The meetings will be appropriately tailored to the level of the audience in attendance.

- Information on software problems encountered at other locations, along with the solution to those problems, when such information is relevant to State software.

The monthly Contractor platform review meetings will include a discussion of software problems encountered at other locations when the Contractor believes that such information is relevant to software on the State's Systems. If it is determined that a patch is critical for the State's environment, the Contractor will notify the State when the critical patch is available and provide a recommendation as to when it should be installed, based on the State's maintenance schedule.

- Recommendations for system upgrades, enhancements etc.

The monthly Contractor platform review meetings will include a discussion of software recommendations for system upgrades, enhancements, etc. of the State's New Systems.

The Contractor will summarize key product announcements that may be of interest to the State and present any recommendations that may be appropriate and related to system upgrades, enhancements, etc.

- Material Defects.

The Contractor will notify the State as errors or defects are identified by Teradata, as to any material errors or defects deliverables known, or made known to the Contractor from any source during the Contract term that could cause the production of inaccurate or otherwise materially incorrect results. The Contractor will initiate actions as may be commercially necessary or proper to effect corrections of any such errors or defects that arise due to its acts or omissions. Reasonable assistance using existing resources will be provided in connection with attempting to resolve errors or defects from other sources.

- Updates.

The Monthly Contractor platform review meetings will include a discussion of potential updates to the State's Teradata Systems.

As new maintenance releases and patches are made available for the Teradata-supported software in a configuration, Teradata will recommend patches that should be applied proactively to avoid possible failures. Critical patches will be reviewed with the State on a weekly basis and other patches will be reviewed with the State on a monthly or quarterly basis as mutually agreed upon.

State Responsibilities for ESS

In order to assist the Contractor in the delivery of Enterprise System Support, the State will fulfill the following responsibilities:

a. Environment

The State is responsible for preparing, prior to the delivery of the New System to be used or serviced hereunder, and maintaining or updating as necessary thereafter, the site of the New System in accordance with the manufacturer's specifications and for providing safe and adequate working conditions for the Contractors maintenance personnel including clean commercial power, appropriate utility service, local telephone extensions and modems, and connectivity for Diagnostic Tools.

b. System Operations

The State is responsible for all operations related to the New System including (i) obtaining appropriate training, as included in this Contract, on the operation of the New System, (ii) assuring that all installations of New System, upgrades, and corrections to a Problem have been performed in conformance to the Contractor's specifications, (iii) providing back-up and restore systems, processes and services for restoration upon a failure of the New Systems, (iv) restoring data, data connections and application software after the Contractor performs the services, (v) safeguarding all software data and removable storage at regularly scheduled intervals and prior to the Contractor performing any services on the New Systems; (vi) any testing related to the New System, (vii) promptly installing Teradata-supplied corrections to reported Problems, and (viii) addressing any system performance problems. The State shall operate the New Systems in accordance with its documentation. The State shall not make, or have made, any corrections, repairs, or alterations to, or perform or have performed any maintenance on, the New Systems except as performed or approved by the Contractor. The State will 1) check Teradata @ Your Service for support and Product discontinuation notices and, 2) identify any target software and/or firmware patches and releases (other than those recommended by Teradata as part of a Problem resolution) to be installed. The State is responsible for accessing Teradata @ Your Service to check the status of change controls and incidents and service performance reports.

c. Teradata @ Your Service Administration

The State will identify in writing and always make available two employees to be its Teradata @ Your Service primary and alternate administrators. Administrators are responsible for approving the addition and removal of Teradata @ Your Service Users associated with their company and for all Teradata @ Your Service functions and viewing permissions associated with each of their company's Teradata @ Your Service Users.

d. Initial Problem Resolution

The State will attempt to isolate and document Problems and agrees to use Teradata's service portal, or similar facility, where available, to check for known corrections to a Problem, track incident statuses, submit and update all Service incidents and to determine the availability of corrections to a Problem and new Software releases.

e. Requirements for all New Systems

The State will allow a token free, high-speed business-to-business virtual private network connection between the State and Teradata to enable remote proactive support and other remote Services. A high-speed virtual private network will have a minimum speed of 128 kilobytes per second. The State will provide any login and passwords required to access the New System remotely upon request from Teradata Customer Services.

f. Diagnostic Tools

The State shall allow Teradata to install and run Diagnostic Tools on the Products (other than BAR Products). These tools are designed to collect and store detailed support related system data to aid in problem resolution and change control and to detect faults and notify Teradata.

H. Security Requirements (Requirements for the New Production, Dev/DR, and Test Systems):

1. The New System must comply with the following security requirements:

- State of Michigan Standards;
- NIST 800 series guidelines located at <http://csrc.nist.gov/publications/nistpubs/> especially 800-64, -53 (data that resides in the Data Warehouse is classified as moderate. Must implement security controls for the moderate security level); and
- FIPS140-2.

2. Security Needs

- a. The New System will support encryption of data at rest and communications with network-attached devices.
- b. The New System will protect the integrity and confidentiality of data is protected by safeguards to prevent release of information without proper consent.
- c. The New System will support role-based security.
- d. Access Control Criteria
 - The New System will support Strong Passwords methodology.
 - The New System will support automated user account removal after specified time period.
 - The New System will support Remote access that requires 2 factor authentication through the use of SecureID technology.
 - The New System will support session expiration according to State standard.
- e. The New System will allow the enforcement of strong passwords according to State policy, 1410.17 Michigan State Government Network Security Policy (AD Guide).
 - The New System will provide a configurable, and enforce requirements for user passwords to be automatically prompted for change after a defined period has passed, minimum of thirty (30) days is recommended.
 - The New System will encrypt passwords in storage.
 - The New System will provide users with the capability to change their own passwords.

- The New System will disable user ID's after a configurable number (3) of consecutive invalid login attempts.
 - The New System will allow the entry of passwords in a non-display field.
 - The New System will encrypt passwords when they are routed over the network.
- f. The New System will support multiple databases (schemas) with flexible access rights. Some access rights must be tightly controlled for access, others may be shared among multiple (but not all) users of the New System, and some are completely available.
 - g. The Contractor will supply and or apply security patches in accordance to a mutually agreed plan that meets the State's security requirements. Receipt by the State or application by the Contractor of patches within twenty-four (24) hours is mandatory.
 - h. The New System will provide column level security capabilities for data sharing. The New System will provide column level security capabilities through the implementation of Database views.
 - i. The New System will provides the capability for secure access control based upon unique user login, for types of record (e.g., fund, order) as well as by function performed upon the record (e.g., Display, Add, Edit, Delete.)
 - j. The New System will check each user's access privileges at login, and automatically disable or enable client functions (in real time) based upon the user's profile.
 - k. The New System will provide varying levels of access within the application, such as administrators, updates, deletes, view only, or scheduling only.
 - l. The New System will log unauthorized access attempts by date, time, user ID, device and location.
 - m. The New System will maintain an audit trail of all security maintenance performed by date, time, user ID, device and location, along with data added, changed or deleted, with easy access to information.
 - n. The New System must be capable of providing security reports of users and access levels.
 - o. The New System will provide the capability for the security administrator to query or print the audit data during normal system operations, or archive the data to review offline and to subsequently generate reports. SQL statements can be used to select data from the audit log and to generate reports on that data. Additionally, the data can be viewed with any BI reporting tool.
 - p. The New System will be capable of providing detailed reports of backups completed and backups failed.
 - q. The New System will have the capability to maintain a historical record of all changes made to any item within the New System (e.g., data element, business rule, process control, software program), the ID of the person or process that made the change, the before and after images of the affected data records, and the date and time the change was made. The audit trail will be configurable to specify different fields to include in the audit trail for individual databases.
 - r. The New System will log all platform events for software, hardware, interfaces, operating system, network, etc. are written to a platform event log in a manner that facilitates debugging of all New System problems.
 - s. The New System will provide the capability to query, view, filter, and sort the platform audit trail by any field and to store the queries. The DBQL and other Teradata system logs are stored in

database tables that can be queried by administrators with appropriate access. SQL or any BI tool can be used to query and report on the log tables

- t. The New System will have the capability to audit all override of edits and audits and identify the login ID, date, and time.
- u. Security auditing can be enabled to audit all attempts to access the security administrator macros including those accessed by the security administrator, to check for possible attempts to learn or compromise system security measures.
- v. The New System will provide the capability to store queries and objects accessed for auditing purposes.
- w. The New System will provide query audit capabilities without significantly reducing the performance of queries.
- x. The New System will provide the capability to separate database security control from duties of the database and system administrator.
- y. The New System will provide a limited set of automated report generation and alert notification capabilities. Security-related log files and data will be stored in database tables that can readily be accessed by the State's BI tools and their automated report generation capabilities.
- z. The New System will meet all applicable Federal and State laws and Regulations (IRS 1075, HIPAA, etc.) when managed to the specifications defined by Contractor.
- aa. The Contractor will provide an architectural network diagram that depicts the way data is transported on the network equipment from one device to the next. The Contractor will provide documentation depicting what ports and protocols Contractor will used to connect to the state network.
- bb. The Contractor staff will attend security Awareness training required by agencies to ensure that users and managers are aware of security risks associated with their activities and are adequately trained to carry out their assigned security-related duties and responsibilities .
- cc. The Contractor will work with the State to update the existing Teradata documentation, as agreed upon with the State, within ninety (90) days of Contract issuance to reflect updates as required to reflect the solution for the New Production, Dev/DR, and Test Systems. Based on the information provided by the State, the updated documentation will include a security threat matrix that includes a complete security plan with disaster recovery, business continuity plan, change management, and identify all controls for confidentiality, Integrity, and Availability.

Attachment 1B (Revised)

Payment Milestones - 5 Year growth

Milestone	State of Michigan Fiscal Year						
	FY11	FY12	FY13	FY14	FY15	FY16	Total
Initial Training Subscription Plus Teradata Partners Conference	29,060						\$29,060.00
Contract Hardware and Software	9,597,979						\$9,597,979.00
Production System Production Migration Completion	\$243,311						\$243,311.00
5450 Deinstallation	\$34,255						\$34,255.00
Test System Production Migration Completion	\$84,452						\$84,452.00
5380 Deinstallation	\$34,755						\$34,755.00
TASM Services	\$45,910						\$45,910.00
DA Implementation Services - Architecture Planning and Design		\$55,926.00					\$55,926.00
DA Implementation Services - Configuration and Setup		\$74,568.00					\$74,568.00
DA Implementation Services - Detail Design and Implementation		\$167,779.00					\$167,779.00
Protegrity Services	\$50,805						\$50,805.00
Ongoing TEN+ Membership plus Teradata Partner Conference		\$29,060.00	\$29,060.00	\$29,060.00	\$29,060.00		\$116,240.00
Teradata Warehouse Miner Training Course 1	\$37,069						\$37,069.00
Teradata Warehouse Miner Training Course 2		\$37,069.00					\$37,069.00
Teradata Warehouse Miner Training Course 3 - CR012				\$37,069.00			\$37,069.00
10 GbE Network Adapter Change - CR013				\$22,900.00			\$22,900.00
Protegrity Software Upgrade - CR014					\$37,000.00		\$37,000.00
Additional Teradata Training during CY 2014 - CR015				\$29,700.00	\$35,640.00		\$65,340.00
TDWI Training - CR015					\$90,000.00	\$45,000.00	\$135,000.00
Teradata Hardening Services - CR016				\$90,000.00			\$90,000.00
Host Group Configuration Services - CR017					\$9,900.00		\$9,900.00
On-Going Training	\$73,684	\$47,504.00	\$47,504.00	\$47,504.00	\$47,504.00		\$263,700.00
DataDirect Software Licenses - CR002	\$32,000						\$32,000.00
DataDirect Software Maintenance - CR002	\$6,600	\$7,660.00	\$8,420.00	\$9,260.00	\$10,190.00		\$42,130.00
Additional ODBC Software and Maintenance Support - CR007		\$15,650.00	\$3,460.00	\$3,810.00	\$4,190.00		\$27,110.00
Additional ODBC Software - CR008		\$3,200.00					\$3,200.00
AIX Systems Hw & SW Mnt 4/1/11 - 9/30/11 - CR002	\$15,827						\$15,827.00
AIX Systems Hw & SW Mnt 10/1/11 - 9/30/16 - CR002		\$34,821.00					\$34,821.00
BI Query Software License and Maintenance - CR003		\$161,799.06	\$88,581.96	\$97,442.76	\$107,185.07		\$455,008.85
BI Query Software Maintenance FY16 - CR018						\$110,490.00	\$110,490.00
Optum Symmetry Software License and Services - CR019					\$467,100.00		\$467,100.00
Business Objects Software Maintenance - CR004		\$37,751.00					\$37,751.00
JSURS Support - CR004		\$272,908.00	\$286,552.00	\$300,880.00			\$860,340.00
	3/1/11 - 9/30/11	10/1/11 - 9/30/12	10/1/12 - 9/30/13	10/1/13 - 9/30/14	10/1/14 - 9/30/15	10/1/15 - 3/31/16	
Warranty - Production System w/AWS Rack	\$267,568	\$191,120.00					\$458,688.00
Warranty - Test System w/AWS Rack	\$198,344	\$141,675.00					\$340,019.00
Warranty - Teradata Warehouse Miner	\$9,051	\$6,465.00					\$15,516.00
Warranty - Dual Active	\$55,319	\$39,514.00					\$94,833.00
CR020 - Prod Sub for 1 Month (inc. Protegrity, Warehouse Miner)						\$ 34,056.00	\$34,056.00
CR020 - Dev/DR Sub for 1 Month (inc. Protegrity, Warehouse Miner)						\$ 25,046.00	\$25,046.00
On-Going Annual Maintenance - Disk Retention Option - CR 009		-	\$26,110.00	\$31,331.00	\$31,331.00	\$15,666.00	\$104,438.00
On-Going Annual Maintenance - COD Pull Ahead - CR 011			\$104,945.17				\$104,945.17
On-Going Annual Maintenance - Prod System w/AWS Rack		\$267,568.00	\$459,560.00	\$526,001.00	\$614,352.00	\$321,939.00	\$2,189,420.00
On-Going Annual Maintenance - Test System w/AWS Rack		\$198,344.00	\$340,733.00	\$368,755.00	\$435,631.00	\$234,680.00	\$1,578,143.00
On-Going Annual Maintenance - Teradata Warehouse Miner		\$9,051.00	\$15,516.00	\$15,516.00	\$15,516.00	\$7,758.00	\$63,357.00
On-Going Annual Maintenance - Dual Active		\$55,319.00	\$95,146.00	\$104,032.00	\$116,972.00	\$60,898.00	\$432,367.00
Total	\$10,815,989	\$1,854,751.06	\$1,505,588.13	\$1,713,260.76	\$2,051,571.07	\$855,533.00	\$18,796,693.01

Ad Board Approved Contract Amount: \$19,073,580.00

Amount Remaining not allocated: \$276,886.99

Attachment 2
Section 1.200 Roles and Responsibilities Modifications

1.200 ROLES AND RESPONSIBILITIES

1.201 CONTRACTOR STAFF, ROLES, AND RESPONSIBILITIES

A. Data Warehouse Platform Staff Requirements

Contractor must provide the staff that will be involved in the installation, configuration, data migration and system conversion, staff requirements are as follows:

1. Contractor must identify a Single Point of Contact (SPOC). The duties of the SPOC shall include, but not be limited to:
 - Supporting the management of the Contract;
 - Facilitating dispute resolution; and
 - Advising the State of performance under the terms and conditions of the Contract.

The State reserves the right to require a change in the current SPOC if the assigned SPOC is not, in the opinion of the State, adequately serving the needs of the State.

Contractor has designated David Wieber, Optum Director of Michigan Operations, to continue as the Single Point of Contact (SPOC) for this project.

2. The Contractor must provide, and update when changed, an organizational chart indicating lines of authority for personnel involved in performance of this Contract and relationships of this staff to other programs or functions of the firm. This chart must also show lines of authority to the next senior level of management and indicate who within the firm will have prime responsibility and final authority for the work.
3. The State has identified the following as key personnel (see section 2.062) for this project:
 - a. Implementation Project Manager/Technical Lead
 - Minimum of 3 years of experience;
 - Played significant role in at least 3 migrations from Teradata to the proposed New Production System;
 - Establishes and manages the project plan, according to SUITE standards, including the development schedule, resource requirements and integration efforts of third party products. Periodically reports progress to State management;
 - Directs migration team; sets goals, objectives and priorities; assigns and reviews work;
 - Coordinate all of the activities of the Contractor personnel assigned to the project and create all reports required by State;
 - Acts as the primary liaison with the State on issues regarding the project deliverable. Makes sure customer reviews are held with the customer user community and obtains sign-off on status reports and requirements;
 - Makes sure approved methods, processes and tools are consistently used;

- Is accountable for meeting project schedule and results as well as for the State customer satisfaction and quality of the deliverables;
- Strong communications skills;
- Manage all defined Contractor responsibilities in this Scope of Services.
- Manage Contractor's subcontractors, if any;
- Coordinate and oversee the day-to-day project activities of the project team;
- Assess and report project feedback and status;
- Escalate project issues, project risks, and other concerns;
- Review all project deliverables and provide feedback;
- Proactively propose/suggest options and alternatives for consideration;
- Utilize change control procedures;
- Prepare project documents and materials; and
- Manage and report on the project's budget.

Contractor has designated **Monty Bieber** as the Project Manager for the Implementation Project, pending the State's approval.

All Key Personnel are subject to the State's interview and approval process. Any key staff substitution must have the prior approval of the State. The State agrees to contact David Wieber, Director of Michigan Operations, the proposed Single Point of Contact (SPOC) for this project, to make arrangements for scheduling such interviews.

4. Normal State working hours are 7:00 a.m. to 6:00 p.m. ET, Monday through Friday, with work performed as necessary after those hours to meet project deadlines. No overtime will be authorized or paid.
5. The State is not obligated to provide State management of assigned work outside of normal State working hours. The State reserves the right to modify the work hours in the best interest of the project.
6. Contractor shall observe the same standard holidays as State employees. The State does not compensate for holiday pay.

C. On Site Work Requirements

1. **Location of Work**
Work is to be performed, completed, and managed at State office buildings in the immediate Lansing, MI area. Some professional services related to projects may be performed in the Contractor's office in the Lansing area, or at an alternative location, on a case-by-case basis as mutually agreed upon.
2. **Travel:**
No travel, travel time or expenses will be reimbursed. This includes travel costs related to training provided to the State by the Contractor.
3. **Additional Security and Background Check Requirements:**
Contractor must present certifications evidencing satisfactory Michigan State Police Background checks (ICHAT) and drug tests for all staff identified for assignment to this project.

All proposed Contractor personnel for platform services must satisfy the security requirements for the agencies in which they will be working - at a minimum, signing the Agency security forms. In addition, some Agencies (Treasury for example) require personnel to attend additional security training and agree to be bound by their requirements.

In addition, proposed Contractor personnel will be required to complete and submit an RI-8 Fingerprint Card for the National Crime Information Center (NCIC) Finger Prints, if required by the project.

Contractor will pay for all costs associated with ensuring their staff meets all requirements.

1.202 STATE STAFF, ROLES, AND RESPONSIBILITIES

- A. The State will provide the following resources for the Contractor's use:
- Work space
 - Minimal clerical support
 - Telephone
 - Printer
 - Access to copiers and fax machine. This includes software licenses as appropriate.
- B. The State will follow an annual purchase order process (APOP) for all service request performed under this Contract. A purchase order (PO) for at least one (1) year at a time will be issued for all resources working under this Contract.
- C. The State will notify Contractor (s) in writing if a senior resource is not performing at a senior level. The Contractor will be responsible for finding a senior level replacement, or will reduce the hourly rate for the person to that of a non-senior resource, at the discretion of the State.
- D. State Executive Subject Matter Experts
The State's Executive Subject Matter Experts (SME) representing the business units involved will provide the business knowledge required for any conversion activities. The Executive SME's will be empowered to:
- Resolve project issues in a timely manner
 - Review project plan, status, and issues
 - Resolve deviations from project plan
 - Provide acceptance sign off
 - Utilize change control procedures
 - Ensure timely availability of State resources
 - Make key implementation decisions, as identified by the Contractor's project manager, within 48-hours of their expected decision date.
- E. State Project Manager
DTMB will provide a Project Manager who will be responsible for the State's infrastructure and coordinating with the Contractor in determining the system configuration.
- The State's Project Manager will provide the following services:
 - Provide State facilities, as needed
 - Coordinate the State resources necessary for the project

- Facilitate coordination between various external contractors
- Facilitate communication between different State departments/divisions
- Provide acceptance and sign-off of deliverable/milestone
- Review and sign-off of timesheets and invoices
- Resolve project issues
- Escalate outstanding/high priority issues
- Utilize change control procedures
- Conduct regular and ongoing review of the project to confirm that it meets original objectives and requirements
- Document and archive all important project decisions
- Arrange, schedule and facilitate State staff attendance at all project meetings.

F. State Project Structure

The Data Warehouse project will be managed by the State Project Manager who will coordinate migration and implementation with all of the agencies that use the System.

Attachment 3
Article 2 - Terms and Conditions Modifications

Article 2 - Terms and Conditions

2.020 Contract Administration

2.021 ISSUING OFFICE

This Contract is issued by the Department of Management and Budget, Purchasing Operations and the Michigan Department of Information Technology (collectively, including all other relevant State of Michigan departments and agencies, the "State"). Purchasing Operations is the sole point of contact in the State with regard to all procurement and Contractual matters relating to the Contract. The Purchasing Operations Contract Administrator for this Contract is:

Terry Mead
Buyer
Purchasing Operations
Department of Technology, Management and Budget
Constitution Hall Building – 1st Floor
525 West Allegan Street
Lansing, MI 48933 meadt@michigan.gov
(517) 284-7035

2.022 CONTRACT COMPLIANCE INSPECTOR

The Director of Purchasing Operations directs the person named below, or his or her designee, to monitor and coordinate the activities for the Contract on a day-to-day basis during its term. **Monitoring Contract activities does not imply the authority to change, modify, clarify, amend, or otherwise alter the prices, terms, conditions and specifications of the Contract. Purchasing Operations is the only State office authorized to change, modify, amend, alter or clarify the prices, specifications, terms and conditions of this Contract.** The Contract Compliance Inspector for this Contract is:

David Bengel
Michigan Department of Technology, Management and Budget
515 Westshire Drive
Lansing, MI 48917
Email: bengeld@michigan.gov
Phone: (517) 241-2921

2.023 PROJECT MANAGER

The following individual will oversee the project:

David Bengel
Michigan Department of Technology, Management and Budget
515 Westshire Drive
Lansing, MI 48917
Email: bengeld@michigan.gov
Phone: (517) 241-2921

2.025 NOTICES

Any notice given to a party under the Contract must be deemed effective, if addressed to the party as addressed below, upon: (i) delivery, if hand delivered; (ii) receipt of a confirmed transmission by facsimile if a copy of the notice is sent by another means specified in this Section; (iii) the third Business Day after being sent by U.S. mail, postage pre-paid, return receipt requested; or (iv) the next Business Day after being sent by a nationally recognized overnight express courier with a reliable tracking system.

State:

State of Michigan
Purchasing Operations
Attention: Terry Mead
Constitution Hall Building – 1st Floor
525 West Allegan Street
Lansing, MI 48933
Contractor:

Name: Optum Government Solutions, Inc..
Address: 12125 Technology Drive
Eden Prairie, MN 55344
Attention: James Franke, Senior Vice President, Optum Government Solutions, Inc.

Either party may change its address where notices are to be sent by giving notice according to this Section.

2.243 LIQUIDATED DAMAGES

A. The parties acknowledge that late or improper completion of the Work will cause loss and damage to the State, and that it would be impracticable and extremely difficult to fix the actual damage sustained by the State as a result. Therefore, Contractor and the State agree that if there is late or improper completion of the Work and the State does not elect to exercise its rights under **Section 2.141**, the State is entitled to collect liquidated damages as follows:

- The amount of \$5,000.00 for each occurrence, and an additional \$100.00 per day for each day Contractor fails, due to the Contractor's negligence, to remedy the late or improper completion of deliverables established in the approved project plan.
- The amount of \$10,000.00 for each month the New Production System up-time average is below the required up-time level in section 1.104-B.3, due to the negligence of the Contractor.
- The amount of \$1,000.00 for each occurrence the Contractor fails to provide or apply security patches within agreed upon time frames established in section 1.104-H.2.g.
- The amount of \$10,000 for each occurrence the Contractor fails to respond to trouble calls within time frames identified in section 1.104-G.1.b.

B. Unauthorized Removal of any Key Personnel

It is acknowledged that an Unauthorized Removal will interfere with the timely and proper completion of the Contract, to the loss and damage of the State, and that it would be

impracticable and extremely difficult to fix the actual damage sustained by the State as a result of any Unauthorized Removal. Therefore, Contractor and the State agree that in the case of any Unauthorized Removal in respect of which the State does not elect to exercise its rights under **Section 2.141**, the State may assess liquidated damages against Contractor as specified below.

For the Unauthorized Removal of any Key Personnel designated in the applicable Statement of Work, the liquidated damages amount is \$25,000.00 per individual if the Contractor identifies a replacement approved by the State under **Section 2.060** and assigns the replacement to the Project to shadow the Key Personnel who is leaving for a period of at least 30 days before the Key Personnel's removal.

If Contractor fails to assign a replacement to shadow the removed Key Personnel for at least 30 days, in addition to the \$25,000.00 liquidated damages for an Unauthorized Removal, Contractor must pay the amount of \$833.33 per day for each day of the 30 day shadow period that the replacement Key Personnel does not shadow the removed Key Personnel, up to \$25,000.00 maximum per individual. The total liquidated damages that may be assessed per Unauthorized Removal and failure to provide 30 days of shadowing must not exceed \$50,000.00 per individual.

Attachment 4a - Cost Tables – 4 Year Extension Period

	FY16 12/1/2015 - 3/31/2016 Implementation	FY16 4/1/2016 - 9/30/2016	FY17 10/1/2016 - 9/30/2017	FY18 10/1/2017 - 9/30/2018	FY19 10/1/2018 - 9/30/2019	FY20 10/1/2019 - 3/31/2020	Total
	4 Months	6 Months	12 Months	12 Months	12 Months	6 Months	52 Months
Hardware and Software							
Production System 2 Node 6800H + 1HSN - Hardware and Software	\$2,332,200.00						\$2,332,200.00
Dev/DR System 2 Node 6800H + 1HSN - Hardware and Software	\$2,014,900.00						\$2,014,900.00
Test System 2-Node 2800 - Hardware and Software	\$782,700.00						\$782,700.00
Hardware and Software Sub-Total	\$5,129,800.00						\$5,129,800.00
Subscription and Capacity on Demand (COD)							
Production COD Software Increments			\$318,700.00	\$364,300.00	\$407,800.00		\$1,090,800.00
Dev/DR COD Software Increments			\$115,300.00	\$203,500.00	\$284,800.00		\$603,600.00
Production Software Subscription		\$186,900.00	\$375,400.00	\$377,100.00	\$377,100.00	\$188,600.00	\$1,505,100.00
Production COD Software Subscription			\$21,500.00	\$64,900.00	\$111,100.00	\$67,700.00	\$265,200.00
Dev/DR Software Subscription		\$125,700.00	\$252,700.00	\$254,200.00	\$254,200.00	\$127,100.00	\$1,013,900.00
Dev/DR COD Software Subscription			\$7,500.00	\$28,700.00	\$61,600.00	\$40,400.00	\$138,200.00
Test Software Subscription		\$20,700.00	\$41,900.00	\$42,500.00	\$42,500.00	\$21,300.00	\$168,900.00
Subscription and COD Totals		\$333,300.00	\$1,133,000.00	\$1,335,200.00	\$1,539,100.00	\$445,100.00	\$4,785,700.00
Services							
Production, Dev/DR Implementation Services	\$660,100.00						\$660,100.00
Test Implementation Services	\$114,700.00						\$114,700.00
System Hardening Services	\$176,000.00		\$181,300.00	\$186,800.00	\$192,400.00	\$198,100.00	\$934,600.00
TASM Migration Services	\$85,100.00						\$85,100.00
TEN+, Teradata Partner Conference, On-Going Training	\$110,400.00		\$112,600.00	\$114,700.00	\$117,500.00	\$119,700.00	\$574,900.00
TDWI Training Services		\$45,000.00	\$90,000.00	\$90,000.00	\$93,750.00	\$46,875.00	\$365,625.00
BI Query Software Maintenance and Support			\$119,510.00	\$134,690.00	\$149,900.00	\$165,110.00	\$569,210.00
Symmetry Software License and Support *			\$449,200.00	\$462,600.00	\$476,500.00	\$490,800.00	\$1,879,100.00
Maintenance							
On-Going Annual Maintenance - Production System		\$276,400.00	\$621,000.00	\$689,300.00	\$703,100.00	\$358,500.00	\$2,648,300.00
On-Going Annual Maintenance - COD Production			\$22,900.00	\$71,700.00	\$128,700.00	\$79,900.00	\$303,200.00
On-Going Annual Maintenance - Dev/DR System		\$226,200.00	\$504,100.00	\$555,900.00	\$567,000.00	\$289,100.00	\$2,142,300.00
On-Going Annual Maintenance - COD Dev/DR			\$8,300.00	\$31,100.00	\$67,000.00	\$44,100.00	\$150,500.00
On-Going Annual Maintenance - Test System		\$83,200.00	\$181,300.00	\$196,300.00	\$200,200.00	\$102,100.00	\$763,100.00
Services Sub-Total	\$1,146,300.00	\$630,800.00	\$2,290,210.00	\$2,533,090.00	\$2,696,050.00	\$1,894,285.00	\$11,190,735.00
Total	\$6,276,100.00	\$964,100.00	\$3,423,210.00	\$3,868,290.00	\$4,235,150.00	\$2,339,385.00	\$21,106,235.00

Notes:

* The additional License Charge per year for each 100,000 covered lives above 2,300,000 shall be \$6,100.00.

Attachment 4b - Cost Tables – 2 Year Optional Extension Period

	FY20 4/1/2020 - 9/30/2020 6 Months	FY21 10/1/2020 - 9/30/2021 12 Months	FY22 10/1/2021 - 3/31/2022 6 Months	Total 24 Months
Subscription and Capacity on Demand (COD)				
COD Production	\$496,000.00	\$229,300.00		\$725,300.00
COD Dev/DR	\$293,100.00	\$364,300.00		\$657,400.00
Production Software Subscription	\$188,600.00	\$377,100.00	\$188,600.00	\$754,300.00
COD Production Subscription	\$97,800.00	\$209,300.00	\$111,500.00	\$418,600.00
Dev/DR Software Subscription	\$127,100.00	\$254,200.00	\$127,100.00	\$508,400.00
COD Dev/DR Subscription	\$59,600.00	\$141,100.00	\$81,500.00	\$282,200.00
Test Software Subscription	\$21,300.00	\$42,500.00	\$21,300.00	\$85,100.00
Subscription and COD Totals	\$1,283,500.00	\$1,617,800.00	\$530,000.00	\$3,431,300.00
Services				
System Hardening Services		\$204,100.00		\$204,100.00
TEN+, Teradata Partner Conference, On-Going Training		\$122,100.00		\$122,100.00
TDWI Training Services	\$46,875.00	\$93,750.00	\$46,875.00	\$187,500.00
BI Query Software Maintenance and Support		\$181,660.00	\$198,210.00	\$379,870.00
Symmetry Software License and Support *		\$505,500.00	\$520,700.00	\$1,026,200.00
Maintenance				
On-Going Annual Maintenance - Production System	\$372,800.00	\$760,500.00	\$387,700.00	\$1,521,000.00
On-Going Annual Maintenance - COD Production	\$118,500.00	\$258,100.00	\$139,600.00	\$516,200.00
On-Going Annual Maintenance - Dev/DR System	\$300,700.00	\$613,300.00	\$312,700.00	\$1,226,700.00
On-Going Annual Maintenance - COD Dev/DR	\$66,900.00	\$162,400.00	\$95,500.00	\$324,800.00
On-Going Annual Maintenance - Test System	\$106,200.00	\$216,500.00	\$110,400.00	\$433,100.00
Services Sub-Total	\$1,011,975.00	\$3,117,910.00	\$1,811,685.00	\$5,941,570.00
Total	\$2,295,475.00	\$4,735,710.00	\$2,341,685.00	\$9,372,870.00

Notes:

* The additional License Charge per year for each 100,000 covered lives above 2,300,000 shall be \$6,100.00.

Attachment 4c - Cost Tables – BI Query Cost Details

Fiscal Year	Agency	Product Description	Unit Price	Quantity	Total Amount
FY2017	DCH	BI Query Admin Existing Support	\$440.00	1	\$440.00
		BI Query User Support for Original 545	\$150.00	545	\$81,750.00
		BI Query User Support for Additional 120	\$190.00	120	\$22,800.00
			FY 2017 DCH Total		\$104,990.00
	Treasury	BI Query Admin Existing Support	\$440.00	2	\$880.00
		BI Query User Support for Original 77	\$150.00	77	\$11,550.00
		BI Query User Support for Additional 9	\$190.00	9	\$1,710.00
			FY 2017 Treasury Total		\$14,140.00
	DTMB	BI Query User Existing Support	\$190.00	2	\$380.00
			FY 2017 DTMB Total		\$380.00
		FY 2017 Total		\$119,510.00	
FY2018	DCH	BI Query Admin Existing Support	\$480.00	1	\$480.00
		BI Query User Support for Original 545	\$170.00	545	\$92,650.00
		BI Query User Support for Additional 120	\$210.00	120	\$25,200.00
			FY 2018 DCH Total		\$118,330.00
	Treasury	BI Query Admin Existing Support	\$480.00	2	\$960.00
		BI Query User Support for Original 77	\$170.00	77	\$13,090.00
		BI Query User Support for Additional 9	\$210.00	9	\$1,890.00
			FY 2018 Treasury Total		\$15,940.00
	DTMB	BI Query User Existing Support	\$210.00	2	\$420.00
			FY 2018 DTMB Total		\$420.00
		FY 2018 Total		\$134,690.00	
FY2019	DCH	BI Query Admin Existing Support	\$530.00	1	\$530.00
		BI Query User Support for Original 545	\$190.00	545	\$103,550.00
		BI Query User Support for Additional 120	\$230.00	120	\$27,600.00
			FY 2019 DCH Total		\$131,680.00
	Treasury	BI Query Admin Existing Support	\$530.00	2	\$1,060.00
		BI Query User Support for Original 77	\$190.00	77	\$14,630.00
		BI Query User Support for Additional 9	\$230.00	9	\$2,070.00
			FY 2019 Treasury Total		\$17,760.00
	DTMB	BI Query User Existing Support	\$230.00	2	\$460.00
			FY 2019 DTMB Total		\$460.00
		FY 2019 Total		\$149,900.00	
FY2020	DCH	BI Query Admin Existing Support	\$580.00	1	\$580.00
		BI Query User Support for Original 545	\$210.00	545	\$114,450.00
		BI Query User Support for Additional 120	\$250.00	120	\$30,000.00
			FY 2020 DCH Total		\$145,030.00
	Treasury	BI Query Admin Existing Support	\$580.00	2	\$1,160.00
		BI Query User Support for Original 77	\$210.00	77	\$16,170.00
		BI Query User Support for Additional 9	\$250.00	9	\$2,250.00
			FY 2020 Treasury Total		\$19,580.00
	DTMB	BI Query User Existing Support	\$250.00	2	\$500.00
			FY 2020 DTMB Total		\$500.00
		FY 2020 Total		\$165,110.00	

Attachment 4c - Cost Tables – BI Query Cost Details – Option Years

Fiscal Year	Agency	Product Description	Unit Price	Quantity	Total Amount
FY2021	DCH	BI Query Admin Existing Support	\$640.00	1	\$640.00
		BI Query User Support for Original 545	\$230.00	545	\$125,350.00
		BI Query User Support for Additional 120	\$280.00	120	\$33,600.00
			FY 2021 DCH Total		\$159,590.00
	Treasury	BI Query Admin Existing Support	\$640.00	2	\$1,280.00
		BI Query User Support for Original 77	\$230.00	77	\$17,710.00
		BI Query User Support for Additional 9	\$280.00	9	\$2,520.00
			FY 2021 Treasury Total		\$21,510.00
	DTMB	BI Query User Existing Support	\$280.00	2	\$560.00
			FY 2021 DTMB Total		\$560.00
			FY 2021 Total		\$181,660.00
	FY2022	DCH	BI Query Admin Existing Support	\$700.00	1
BI Query User Support for Original 545			\$250.00	545	\$136,250.00
BI Query User Support for Additional 120			\$310.00	120	\$37,200.00
		FY 2022 DCH Total		\$174,150.00	
Treasury		BI Query Admin Existing Support	\$700.00	2	\$1,400.00
		BI Query User Support for Original 77	\$250.00	77	\$19,250.00
		BI Query User Support for Additional 9	\$310.00	9	\$2,790.00
		FY 2022 Treasury Total		\$23,440.00	
DTMB		BI Query User Existing Support	\$310.00	2	\$620.00
		FY 2022 DTMB Total		\$620.00	
		FY 2022 Total		\$198,210.00	

Attachment 5 Optional Components Cost Tables

	Base Period - 4 Years							Optional Extension Period - 2 Years			
	FY16 12/1/2015 - 3/31/2016 Implementation	FY16 4/1/2016 - 9/30/2016	FY17 10/1/2016 - 9/30/2017	FY18 10/1/2017 - 9/30/2018	FY19 10/1/2018 - 9/30/2019	FY20 10/1/2019 - 3/31/2020	Total	FY20 4/1/2020 - 9/30/2020	FY21 10/1/2020 - 9/30/2021	FY22 10/1/2021 - 3/31/2022	Total
	4 Months	6 Months	12 Months	12 Months	12 Months	6 Months	52 Months	6 Months	12 Months	6 Months	24 Months
Protegrity											
Protegrity Software Licensing	\$425,100.00						\$425,100.00				\$0.00
Protegrity Upgrade Services	\$57,600.00		\$59,400.00	\$61,200.00	\$63,000.00		\$241,200.00	\$64,900.00	\$68,800.00		\$133,700.00
Protegrity Subscription		\$73,700.00	\$151,100.00	\$158,700.00	\$166,600.00	\$85,400.00	\$635,500.00	\$89,600.00	\$183,700.00	\$94,100.00	\$367,400.00
Protegrity Sub-Total	\$482,700.00	\$73,700.00	\$210,500.00	\$219,900.00	\$229,600.00	\$85,400.00	\$1,301,800.00	\$154,500.00	\$252,500.00	\$94,100.00	\$501,100.00
Hadoop											
Hadoop Hardware and Software	\$602,500.00						\$602,500.00				\$0.00
Hadoop Implementation Services	\$9,400.00						\$9,400.00				\$0.00
Hadoop Hardening Services	\$184,000.00		\$100,300.00	\$103,300.00	\$106,400.00	\$109,600.00	\$603,600.00		\$112,900.00		\$112,900.00
Hadoop Subscription		\$8,100.00	\$36,000.00	\$54,600.00	\$57,300.00	\$30,700.00	\$186,700.00	\$31,800.00	\$64,400.00	\$32,600.00	\$128,800.00
Hadoop Maintenance		\$87,900.00	\$176,100.00	\$176,100.00	\$179,200.00	\$91,400.00	\$710,700.00	\$95,000.00	\$193,800.00	\$98,800.00	\$387,600.00
Hadoop COD for Unity Server Connection			\$9,700.00	\$11,800.00	\$14,400.00		\$35,900.00	\$16,300.00	\$11,800.00		\$28,100.00
Hadoop Related Education		\$72,000.00	\$77,400.00	\$82,700.00	\$88,000.00	\$93,400.00	\$413,500.00		\$98,700.00		\$98,700.00
Hadoop Sub-Total	\$795,900.00	\$168,000.00	\$399,500.00	\$428,500.00	\$445,300.00	\$325,100.00	\$2,562,300.00	\$143,100.00	\$481,600.00	\$131,400.00	\$756,100.00
QueryGrid											
QueryGrid Hardware and Software	\$209,300.00						\$209,300.00				\$0.00
QueryGrid COD Increases			\$9,700.00	\$11,800.00	\$14,400.00		\$35,900.00	\$16,300.00	\$11,800.00		\$28,100.00
QueryGrid Subscription		\$8,100.00	\$16,800.00	\$18,200.00	\$20,000.00	\$10,500.00	\$73,600.00	\$11,600.00	\$23,900.00	\$12,400.00	\$47,900.00
QueryGrid Maintenance		\$20,000.00	\$44,500.00	\$51,000.00	\$55,200.00	\$28,800.00	\$199,500.00	\$31,300.00	\$64,800.00	\$33,600.00	\$129,700.00
QueryGrid Sub-Total	\$209,300.00	\$28,100.00	\$71,000.00	\$81,000.00	\$89,600.00	\$39,300.00	\$518,300.00	\$59,200.00	\$100,500.00	\$46,000.00	\$205,700.00
Total	\$1,487,900.00	\$269,800.00	\$681,000.00	\$729,400.00	\$764,500.00	\$449,800.00	\$4,382,400.00	\$356,800.00	\$834,600.00	\$271,500.00	\$1,462,900.00

Attachment 6
New Production System Configuration
Teradata 2-Node 6800H + 1 Hot Standby Node

Qty.	Teradata Part #	Description
Active Node Hardware		
1	9221-2001-8090	6800H 1-node (E31S) 10 core, Base Cabinet, Linux, 512GB
1	9221-F051	30A 3-Ph Delta 4 Cord, Type B, North American, Watertight
1	9221-F101	6800H 1-Node (E31S) 10 core, Linux, 512GB
1	9221-F111	6800H Hot Standby Node (E31S) 10 core, Linux, 512GB
4	9221-F200	Data Encryption, HDDs, (Servers)
6	9221-F250	ADPT-PCIe 10Gb Ethernet, 2 Channel, Fiber Optic
3	9221-F254	Adapter-PCIe, BYNET V5, IB, 2CH, LP - FCAT
12	9221-F256	ADPT-PCIe3, SAS2, 6Gb, 2-Port
1	9221-F300	Cabinet VMS: (Intel R1000 - 1U)
4	9221-F497	DAP Controller Enhancement per Array
4	9221-F498	Data Encryption for Disk Trays - HDDs & SSD's, (Storage)
1	9221-F502	Switch, BYNET-V5, 36 Port, IB (2 Switches)
6	9221-F599	Cable Assy, InfiniBand - QSFP+ Copper Cable Assembly, 2.0-meter
2	9221-F921	6800 - Hot Standby Node Enabling - 512GB
1	9221-F925	6800 2+1 Clique - (Staging Reference Feature)
1	9221-F930	6800 Base Cabinet Install Feature
3	9221-F931	1 - Node Install Feature
16	9221-F932	1 - Disk Drive Enclosure Install Feature
1	9221-K013	Rack 42U Side Panels (2)
1	9221-K019	9221 System Kit
1	F785-9810-0000	6800 - 10 Core Reference PID
1	2021-K221	Stabilizer Brackets
Storage Hardware		
12	9221-F400	Disk Drive Enclosure - Camden/w ESM (24) 2-1/2 HDD
4	9221-F405	Disk Drive Enclosure - Camden with 12Gb/s HIC (24) 2-1/2 HDD
336	9221-F410	300GB 2.5", 10K RPM, SAS HDD
16	9221-F415	300GB 2.5" 10K RPM, SAS HDD - Global Hot Spare
32	9221-F484	SSD, 1.6TB, 2.5", FDE, PI, Toshiba PM2, SAS, NTAP
24	9221-F494	Cable Assembly, SAS, 2M (one cable)
32	9221-F495	Cable Assembly, SAS, 1M (one cable)
Production/Test Location BAR Hardware		
4	1413-C163-0150	Cable, QDR/FDR10 QSFP Optical Cable, 15M
1	9212-1000-8090	Teradata Platform Framework Cabinet (PFC)
1	9212-F050	Power Distribution Unit, 30A, IEC, All Countries
1	9212-F071	Door, Color Insert (Neutral)
1	9212-F233	TMSB Adapter-PCIe 8Gb Fibre Channel, 4 Channel, STD
2	9212-F234	TMSB Adapter-PCIe 10Gb Ethernet, 2 Channel, Fiber, LP
1	9212-F724	TMS (E14S), Viewpoint, 10GbE Opt, Model 819-10F
1	9212-F884	9212 Base Cabinet Install Feature
1	9212-F940	PFC, Front Filler Panel, 1U

Qty.	Teradata Part #	Description
15	9212-F941	PFC, Front Filler Panel, 2U
1	9212-F997	TMS, Staging & Integration, (Reference Feature)
1	9212-K072	Rack 42U, Side Panels (2)
1	9212-K936	Platform Framework Cabinet (PFC) System Accessory Kit
Software		
1	F785-2947-0000	Teradata DBS for Hot Standby Node - SUSE Linux
20	F444-1400-0000	SSD Enabled Capacity - Enabled Disk Space in 5% Increments of full capacity
10	F444-1402-0000	HDD Enabled Capacity - Enabled Disk Space in 5% Increments of full capacity
10	F444-1403-0000	HDD Disk Space COD - Available Disk Space on Demand in 5% of full capacity
79	F444-7500-0000	WM COD Enabled Increment - 1 percent (1%)
21	F444-7510-0000	WM COD Available Increment - 1 percent (1%)
4	F601-8247-0000	SuSE Linux SLES License, per node
1	F601-8248-0000	SUSE Linux SLES License for CMIC
1	F601-8290-0000	Linux SLES 11 SP1 BCD0-1388 for CMIC: SW Media Kit 892000328001
1	F601-8295-0000	Linux SLES 11 SP1 BCD0-1842: SW Media Kit 892000328001
1	F601-9555-0000	Sun Java Windows (Embedded)
354	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
41	F853-8855-0000	Teradata 15.00 6800 SLES11 High Capacity Enterprise WH Edition, per TPerf
313	F853-8955-0000	Teradata 15.00 6800 SLES11 High Capacity Enterprise WH Edition - Migration, per TPerf
1	F853-9023-0000	Teradata 15.00 Temporal for Enterprise Bundle (Bundling Reference Only)
1	F853-9024-0000	Teradata 15.00 Columnar for Enterprise Bundle (Bundling Reference Only)
1	F853-9028-0000	Teradata 15.00 QueryGrid: TD DB-to-Teradata for Enterprise Bundle (Bundling Reference Only)
1	F853-9999-0000	Teradata 15.00 Database Reference (No License Value)
4	G460-0370-0000	SYMPlicity 10 and TDMP for EDW
1	G460-1070-0000	Media for SYM 10 & Multipathing SW 9.03 - SLES9, SLES10 & SLES11
4	G460-2025-0000	NetApp/LSI: Storage - Full Disk Encryption for 6700C/6750H EDW, per controller (pair)
4	G460-20T1-0000	NetApp Storage - Turbo Performance 1 for 6750
1	F152-9019-0000	Unity Ecosystem Manager 15.00 - Bundling Component - Active
1	F574-9715-0000	Teradata Meta Data Services 15.00 - System License
1	F864-9001-0000	TTU 15.10 - Teradata Utility Pak (Bundling Component Only)
1	F864-9005-0000	TTU 15.10 - Teradata Analyst Pack (Bundling Component Only)
1	F864-9006-0000	TTU 15.10 - Teradata C Preprocessor2 (Bundling Component Only)
1	F864-9007-0000	TTU 15.10 - Teradata COBOL Preprocessor2 (Bundling Component Only)
1	F864-9008-0000	TTU 15.10 - Teradata FastExport (Bundling Component Only)
1	F864-9009-0000	TTU 15.10 - Teradata PT Export Operator (Bundling Component Only)
1	F864-9010-0000	TTU 15.10 - Teradata FastLoad (Bundling Component Only)
1	F864-9011-0000	TTU 15.10 - Teradata PT Load Operator (Bundling Component Only)
1	F864-9012-0000	TTU 15.10 - Teradata MultiLoad (Bundling Component Only)
1	F864-9013-0000	TTU 15.10 - Teradata PT Update Operator (Bundling Component Only)
1	F864-9014-0000	TTU 15.10 - Teradata TPUMP (Bundling Component Only)
1	F864-9015-0000	TTU 15.10 - Teradata PT Stream Operator (Bundling Component Only)
1	F864-9021-0000	TTU 15.10 - Teradata Active System Management (Bundling Component Only)
354	F864-ENTP-0000	TTU 15.10 - Enterprise Bundle Package - per TPerf

Qty.	Teradata Part #	Description
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
Production/Test Location BAR Software		
2	F904-0003-0000	BAR Solution - Enterprise Fit for Production 2+1 6800-H:
1	F904-ONEW-0000	DSE for NetBackup - New Order (ESDM)
2	F904-2505-0000	Teradata Data Stream Extension 15.00 for NetBackup (ESDM, Enterprise Fit) - per Node
1	F904-ESM3-0000	BAR Solution - Enterprise Fit (Non ESDM)
1	9212-F737	TMS (E14S), BAR DSC Admin/Data, Model 855AD
1	9212-F997	TMS, Staging & Integration, (Reference Feature)
Year 2 Subscription and COD		
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
4	F601-8247-A000	Subscription SuSE Linux SLES License, per node
47	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
47	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
47	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
47	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
47	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
Year 3 Subscription and COD		
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
4	F601-8247-A000	Subscription SuSE Linux SLES License, per node
48	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
48	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
48	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
12%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
95	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
95	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
Year 4 Subscription and COD		
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
4	F601-8247-A000	Subscription SuSE Linux SLES License, per node
53	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
53	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
53	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
15%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
148	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
148	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
Year 5 Subscription and COD		
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)

Qty.	Teradata Part #	Description
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
4	F601-8247-A000	Subscription SuSE Linux SLES License, per node
66	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
66	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
66	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
15%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
214	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
214	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
Year 6 Subscription and COD		
354	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
354	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
3	F574-1120-C000	Subscription Teradata Warehouse Miner for 5xx/6xx/5xxx/6xxx: per Node SMS
4	F601-8247-A000	Subscription SuSE Linux SLES License, per node
30	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
30	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
30	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
8%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
244	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
244	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
Notes		
1	NOTE-TERA-0001	United States
1	NOTE-TERA-0002	Largest Clique Size = 2 + 1
1	NOTE-TERA-0004	Number of Nodes = 3
1	NOTE-TERA-0005	This order has Capacity on Demand (COD) enabled. Full Capacity is when no throttles are placed on the system. The actual Tperf for software pricing is calculated by multiplying the Full Capacity by the COD % Enabled.
1	NOTE-TERA-0006	For expansions, the percent of Full Capacity purchased is lower than the percent of Full Capacity delivered by an amount equal to the reduced throughput of previous nodes in the system.

Attachment 7
New Development/Disaster Recovery System Configuration
Teradata 2-Node 6800H + 1 Hot Standby Node

Qty.	Teradata Part #	Description
Active Node Hardware		
2	1413-C163-0150	Cable, QDR/FDR10 QSFP Optical Cable, 15M
1	9221-2002-8090	6800H 1-node (E31S) 8 core, Base Cabinet, Linux, 512GB
1	9221-F051	30A 3-Ph Delta 4 Cord, Type B, North American, Watertight
1	9221-F102	6800H 1-Node (E31S) 8 core, Linux, 512GB
1	9221-F112	6800H Hot Standby Node (E31S) 8 core, Linux, 512GB
4	9221-F200	Data Encryption, HDDs, (Servers)
6	9221-F250	ADPT-PCIe 10Gb Ethernet, 2 Channel, Fiber Optic
3	9221-F254	Adapter-PCIe, BYNET V5, IB, 2CH, LP - FCAT
12	9221-F256	ADPT-PCIe3, SAS2, 6Gb, 2-Port
1	9221-F300	Cabinet VMS: (Intel R1000 - 1U)
1	9221-F502	Switch, BYNET-V5, 36 Port, IB (2 Switches)
6	9221-F599	Cable Assy, InfiniBand - QSFP+ Copper Cable Assembly, 2.0-meter
2	9221-F921	6800 - Hot Standby Node Enabling - 512GB
1	9221-F925	6800 2+1 Clique - (Staging Reference Feature)
1	9221-F930	6800 Base Cabinet Install Feature
3	9221-F931	1 - Node Install Feature
16	9221-F932	1 - Disk Drive Enclosure Install Feature
3	9221-F985	UDA - STAGING & INTEGRATION (per node)
1	9221-K013	Rack 42U Side Panels (2)
1	9221-K019	9221 System Kit
1	F785-9808-0000	6800 - 8 Core Reference PID
1	2021-K221	Stabilizer Brackets
1	F785-2947-0000	Teradata DBS for Hot Standby Node - SUSE Linux
Storage Hardware		
12	9221-F400	Disk Drive Enclosure - Camden/w ESM (24) 2-1/2 HDD
4	9221-F405	Disk Drive Enclosure - Camden with 12Gb/s HIC (24) 2-1/2 HDD
288	9221-F410	300GB 2.5", 10K RPM, SAS HDD
16	9221-F415	300GB 2.5" 10K RPM, SAS HDD - Global Hot Spare
32	9221-F484	SSD, 1.6TB, 2.5", FDE, PI, Toshiba PM2, SAS, NTAP
24	9221-F494	Cable Assembly, SAS, 2M (one cable)
32	9221-F495	Cable Assembly, SAS, 1M (one cable)
4	9221-F497	DAP Controller Enhancement per Array
4	9221-F498	Data Encryption for Disk Trays - HDDs & SSD's, (Storage)
48	9221-F499	Camden Disk Drive Enclosure - Blank Filler, Black, 2.5" Hard Drive
Dev/DR Location BAR Hardware		
1	9212-1000-8090	Teradata Platform Framework Cabinet (PFC)
1	9212-F050	Power Distribution Unit, 30A, IEC, All Countries
1	9212-F071	Door, Color Insert (Neutral)
1	9212-F233	TMSB Adapter-PCIe 8Gb Fibre Channel, 4 Channel, STD
2	9212-F234	TMSB Adapter-PCIe 10Gb Ethernet, 2 Channel, Fiber, LP

Qty.	Teradata Part #	Description
1	9212-F722	TMS (E14S), Viewpoint, Model 819
1	9212-F737	TMS (E14S), BAR DSC Admin/Data, Model 855AD
1	9212-F884	9212 Base Cabinet Install Feature
1	9212-F940	PFC, Front Filler Panel, 1U
16	9212-F941	PFC, Front Filler Panel, 2U
2	9212-F997	TMS, Staging & Integration, (Reference Feature)
1	9212-K072	Rack 42U, Side Panels (2)
1	9212-K936	Platform Framework Cabinet (PFC) System Accessory Kit
Software		
20	F444-1400-0000	SSD Enabled Capacity - Enabled Disk Space in 5% Increments of full capacity
10	F444-1402-0000	HDD Enabled Capacity - Enabled Disk Space in 5% Increments of full capacity
10	F444-1403-0000	HDD Disk Space COD - Available Disk Space on Demand in 5% of full capacity
75	F444-7500-0000	WM COD Enabled Increment - 1 percent (1%)
25	F444-7510-0000	WM COD Available Increment - 1 percent (1%)
7	F601-8247-0000	SuSE Linux SLES License, per node
1	F601-8248-0000	SUSE Linux SLES License for CMIC
1	F601-8280-0000	Linux SLES 10/11 SP3 BCD0-1553; SW Media Kit 892000328001
1	F601-8290-0000	Linux SLES 11 SP1 BCD0-1388 for CMIC: SW Media Kit 892000328001
2	F601-8295-0000	Linux SLES 11 SP1 BCD0-1842: SW Media Kit 892000328001
1	F601-9555-0000	Sun Java Windows (Embedded)
252	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
14	F853-8855-0000	Teradata 15.00 6800 SLES11 High Capacity Enterprise WH Edition, per TPerf
238	F853-8955-0000	Teradata 15.00 6800 SLES11 High Capacity Enterprise WH Edition - Migration, per TPerf
1	F853-9023-0000	Teradata 15.00 Temporal for Enterprise Bundle (Bundling Reference Only)
1	F853-9024-0000	Teradata 15.00 Columnar for Enterprise Bundle (Bundling Reference Only)
1	F853-9028-0000	Teradata 15.00 QueryGrid: TD DB-to-Teradata for Enterprise Bundle (Bundling Reference Only)
1	F853-9999-0000	Teradata 15.00 Database Reference (No License Value)
4	G460-0370-0000	SYMplicity 10 and TDMP for EDW
1	G460-1070-0000	Media for SYM 10 & Multipathing SW 9.03 - SLES9, SLES10 & SLES11
4	G460-2025-0000	NetApp/LSI: Storage - Full Disk Encryption for 6700C/6750H EDW, per controller (pair)
4	G460-20T1-0000	NetApp Storage - Turbo Performance 1 for 6750
1	F152-9019-0000	Unity Ecosystem Manager 15.00 - Bundling Component - Active
1	F574-9715-0000	Teradata Meta Data Services 15.00 - System License
1	F801-5551-0000	Teradata Viewpoint Appliance Portal, Self Serv & Mgmt Portlets 15.00
1	F863-9001-0000	TTU 15.0 - Teradata Utility Pak (Bundling Component Only)
1	F863-9005-0000	TTU 15.0 - Teradata Analyst Pack (Bundling Component Only)
1	F863-9006-0000	TTU 15.0 - Teradata C Preprocessor2 (Bundling Component Only)
1	F863-9007-0000	TTU 15.0 - Teradata COBOL Preprocessor2 (Bundling Component Only)
1	F863-9008-0000	TTU 15.0 - Teradata FastExport (Bundling Component Only)
1	F863-9009-0000	TTU 15.0 - Teradata PT Export Operator (Bundling Component Only)
1	F863-9010-0000	TTU 15.0 - Teradata FastLoad (Bundling Component Only)
1	F863-9011-0000	TTU 15.0 - Teradata PT Load Operator (Bundling Component Only)
1	F863-9012-0000	TTU 15.0 - Teradata MultiLoad (Bundling Component Only)

Qty.	Teradata Part #	Description
1	F863-9013-0000	TTU 15.0 - Teradata PT Update Operator (Bundling Component Only)
1	F863-9014-0000	TTU 15.0 - Teradata TPUMP (Bundling Component Only)
1	F863-9015-0000	TTU 15.0 - Teradata PT Stream Operator (Bundling Component Only)
1	F863-9021-0000	TTU 15.0 - Teradata Active System Management (Bundling Component Only)
252	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Dev/DR Location BAR Software		
1	F904-0003-0000	BAR Solution - Enterprise Fit
1	F904-0NEW-0000	DSE for NetBackup - New Order (ESDM)
2	F904-2505-0000	Teradata Data Stream Extension 15.00 for NetBackup (ESDM, Enterprise Fit) - per Node
1	F904-ESM3-0000	BAR Solution - Enterprise Fit (Non ESDM)
Year 2 Subscription and COD		
17	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
17	F853-8855-0000	Teradata 15.00 6800 SLES11 High Performance Enterprise WH Edition, per TPerf
17	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
17	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
17	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Year 3 Subscription and COD		
30	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
30	F853-8855-0000	Teradata 15.00 6800 SLES11 High Performance Enterprise WH Edition, per TPerf
30	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
47	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
47	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Year 4 Subscription and COD		
42	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
42	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
42	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
89	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
89	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Year 5 Subscription and COD		
42	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
42	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
42	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf

Qty.	Teradata Part #	Description
3%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
131	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
131	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per Tperf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Year 6 Subscription and COD		
48	F853-4500-0000	Teradata 15.00 - Virtual Storage for 56xx/66xx/67xx, per TPerf
48	F853-8855-0000	Teradata 15.00 6800 SLES11 High Perf. Enterprise WH Edition, per TPerf
48	F863-ENTP-0000	TTU 15.0 - Enterprise Bundle Package, per TPerf
14%	9221-F412	600GB 2.5", 10K RPM, SAS HDD
179	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
179	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per Tperf
252	F787-4500-A000	Teradata Virtual Storage Subs/Initial 55xx/56xx/6xxx (per TPerf)
252	F787-8850-A000	Teradata Subscription - 6800 High Capacity Enterprise WH Edition, per TPerf
7	F601-8247-A000	Subscription SuSE Linux SLES License, per node
Notes		
1	NOTE-TERA-0001	United States
1	NOTE-TERA-0002	Largest Clique Size = 2 + 1
1	NOTE-TERA-0004	Number of Nodes = 3
1	NOTE-TERA-0005	This order has Capacity on Demand (COD) enabled. Full Capacity is when no throttles are placed on the system. The actual Tperf for software pricing is calculated by multiplying the Full Capacity by the COD % Enabled.
1	NOTE-TERA-0006	For expansions, the percent of Full Capacity purchased is lower than the percent of Full Capacity delivered by an amount equal to the reduced throughput of previous nodes in the system.

Attachment 8
New Test System Configuration
Teradata 2-Node 2800

Qty.	Teradata Part #	Description
Active Node Hardware		
1	9190-2000-8090	2800 Base Cabinet, BYNET V5
14	9190-F021	Panel, Front Filler - 2U
1	9190-F051	30A Three Phase DELTA - Four Cords per Cabinet- N. Amer. Type Power
1	9190-F073	KMM
2	9190-F100	2800 Node, (2) 2.6GHz CPU, (2) 900GB, (1) 600GB HDD's, (Intel R1)
4	9190-F200	2800 Warehouse Data Encryption (Server)
2	9190-F207	Module, Dual RJ-45 Port 10GBASE-T I/O
2	9190-F254	Adapter-PCIe, BYNET V5, IB, 2CH, LP - FCAT
2	9190-F265	Adapter-PCIe3, SAS2, 6Gb, 4-Port
8	9190-F282	Memory - 128GB, DDR4, (4 X 32GB LRDIMM)
1	9190-F302	System VMS: (Intel R1000 - 1U)
1	9190-F402	RBOD, Disk Drive Enclosure - Atlas/Gallium 6Gb/s (48) 2-1/2 HDD
1	9190-F403	EBOD, Disk Drive Enclosure - Expansion (48) 2-1/2 HDD
4	9190-F481	Cable Assembly, MiniSASHD, 1M (one cable)
2	9190-F485	Cable Assembly, MiniSAS, 1M (one cable)
14	9190-F490	Blank Filler, Black, 2.5" Hard Drive, Disk Drive Enclosure - Dot Hill
2	9190-F497	2800 Data Warehouse Encryption (Storage)
1	9190-F502	Switch, BYNET-V5, 36 Port, IB (2 Switches)
4	9190-F599	Cable Assy, InfiniBand - QSFP+ Copper Cable Assembly, 2.0-meter
1	9190-F921	2800 Data Warehouse Half-Clique RAID 1 HW/SW Bundle
1	9190-F926	2800 Data Warehouse BYNET V5 HW/SW Bundle per 2 nodes
1	9190-F940	9190 Base Cabinet Install Feature
2	9190-F941	1 - Node Install Feature
1	2021-K221	Stabilizer Brackets
4	2021-K265	10Gb SFP+, SR, Optical for 10GbE Adapter (Qty=1)
Storage Hardware		
80	9190-F413	HDD, 900GB, 2.5", FDE, 10K, SAS, Hot Plug
2	9190-F418	GHS-HDD, 900GB, 2.5", FDE, 10K, SAS, Hot Plug
2	9190-F942	1 - Disk Drive Enclosure Install Feature w/SED HDD Capability
1	9190-K013	Kit, Rack 42U, Side Panels
1	9190-K019	Kit, 9190 System
1	9190-K250	Kit, Adapter-PCIe 10Gb Ethernet, 2Ch, Fiber Optic
2	9190-K413	Kit, HDD, 900GB, 2.5", FDE, 10K, SAS, Hot Plug
22	9190-K984	Kit, 2800 Data Space Activation, 1.0TB with 900GB Drives
8	9190-K985	Kit, 2800 Data Space Activation, 0.1TB with 900GB Drives
Software		
1	F444-6733-0000	VMS Server Management Software for 2800
20	F444-7200-0000	HDD Enabled Capacity - Enabled Disk Space in 5% Inc. of full capacity
4	F601-8247-0000	SuSE Linux SLES License, per node
1	F601-8248-0000	SUSE Linux SLES License for CMIC

Qty.	Teradata Part #	Description
1	F601-8290-0000	Linux SLES 11 SP1 BCD0-1388 for CMIC: SW Media Kit 892000328001
1	F601-8295-0000	Linux SLES 11 SP1 BCD0-1842: SW Media Kit 892000328001
1	F601-9555-0000	Sun Java Windows (Embedded)
1	F853-3987-0000	Teradata 15.00 / TTU 15.00 or later - 2800 SLES11 SW Bundle, per each 2 nodes
1	F853-4633-0000	Teradata 15.00 Temporal Support for 2800 Appliance, per each 2 nodes
1	F853-4833-0000	Teradata 15.00 Columnar for 2800 Appliance, per each 2 nodes
1	F853-9999-0000	Teradata 15.00 Database Reference (No License Value)
1	F853-Q0T2-0000	Teradata QueryGrid: TD 15.00 - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
1	F802-5533-0000	VMS Viewpoint 15.10 Portal, Self Service and Management Portlets for 2800 Appliance
1	F864-7933-0000	TTU 15.10 - 2800 Teradata TPUMP/Stream Operator, per each 2 nodes
1	F864-9001-0000	TTU 15.10 - Teradata Utility Pak (Bundling Component Only)
1	F864-9005-0000	TTU 15.10 - Teradata Analyst Pack (Bundling Component Only)
1	F864-9006-0000	TTU 15.10 - Teradata C Preprocessor2 (Bundling Component Only)
1	F864-9007-0000	TTU 15.10 - Teradata COBOL Preprocessor2 (Bundling Component Only)
1	F864-9008-0000	TTU 15.10 - Teradata FastExport (Bundling Component Only)
1	F864-9009-0000	TTU 15.10 - Teradata PT Export Operator (Bundling Component Only)
1	F864-9010-0000	TTU 15.10 - Teradata FastLoad (Bundling Component Only)
1	F864-9011-0000	TTU 15.10 - Teradata PT Load Operator (Bundling Component Only)
1	F864-9012-0000	TTU 15.10 - Teradata MultiLoad (Bundling Component Only)
1	F864-9013-0000	TTU 15.10 - Teradata PT Update Operator (Bundling Component Only)
1	F864-9020-0000	TTU 15.10 - Teradata System Filters & Throttles Portlets (Appliance Bundling Component)
1	F864-AP28-0000	TTU 15.10 - Enhanced Appliance Pak for 2800, per each 2 nodes
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
Year 2 Subscription		
4	F601-8247-A000	SuSE Linux SLES License, per node
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
Year 3 Subscription		
4	F601-8247-A000	SuSE Linux SLES License, per node
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)

Qty.	Teradata Part #	Description
Year 4 Subscription		
4	F601-8247-A000	SuSE Linux SLES License, per node
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
Year 5 Subscription		
4	F601-8247-A000	SuSE Linux SLES License, per node
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
Year 6 Subscription		
4	F601-8247-A000	SuSE Linux SLES License, per node
1	F787-2987-A000	Teradata Subscription - 2800 Software Bundle, per each 2 nodes
1	F787-4633-A000	Teradata Subscription - Temporal Support for 2800 Appliance, per each 2 nodes
1	F787-4833-A000	Teradata Subscription - Columnar Support for 2800 Appliance, per each 2 nodes
1	F787-5040-A000	Teradata Subscription - TPUMP/PT Stream Operator, 2-node 2700/2750/2800 Appliance
1	F987-Q0T2-A000	Teradata Subscription: QueryGrid: TD DB - to - Teradata - 2-Node Appliance, per each 2 nodes (<=12 Nodes/System)
Notes		
1	NOTE-TERA-0001	United States
1	NOTE-TERA-0002	Largest Clique Size = 2
1	NOTE-TERA-0004	Number of Nodes = 2
1	NOTE-TERA-0012	Physical Customer Data Space = 22.8 TB

Attachment 9

System Installation Services Statement of Work

1. NATURE OF THE PROJECT

Teradata System Installation provides the complete setup (hardware and software) of a Teradata system. Teradata will document site floor plan and system maps, performs on-site installation, complete on-site testing to validate hardware and software functionality, confirm connectivity, and verify hardware, firmware and software release level compliance.

2. SERVICES

The Services consist of the following:

2.1. Pre-Installation

- Prepare change control and request proper approvals
- Coordinate deliverables with customer
- Coordinate deliverables with site team
- Provide customer with site environmental requirements (e.g. AC power and air handling)
- Perform site survey (Power, Floor Tiles, Phone Lines, Internal & External LAN, Cabinet Layout)
- Develop a site floor plan
- Define and document the physical system layout and cabling scheme
- Identify necessary naming conventions and IP addressing
- Validate System Requirements
- Validate Hardware/Software Order
- Define Data/OS mirroring and RAID requirements
- Verify electrical power input lines and internal system power level compliance
- Verify power with electricians
- Verify site preparation is complete

2.2. Hardware Installation

- Thoroughly inspect hardware components for any possible damage
- Physically install all cabinets and bolt in place
- Install any non-TPA servers (TMS)
- Install skins, bezels, doors, cosmetic crowns...etc.
- Install Administrative Workstation
- Install Teradata certified peripheral devices
- Install Host connection
- Configure TCP/IP and connect to C-LAN if necessary
- Configure TVI
- Validate hardware and firmware levels are current and Field Retrofit Order (FRO) compliant
- Validate the battery subsystems are fully charged and operational
- Power-up hardware per specifications
- Establish peripheral connectivity and confirm compliance per manufacturing settings

2.3. Software Installation

- Load Teradata host software as ordered and check that it is compliant with IBM (MVS/VM) host system software
- Validate Operating System (OS) prompt is achieved on hardware platform

- Validate that the OS tunables are set to factory defaults
- Validate that the operating system software is compliant with current or agreed upon release levels
- Validate that Teradata software is at the current or agreed upon manufacturing release levels
- Validate that Teradata comes to Trusted Parallel Application (TPA) on all nodes
- Validate that all Teradata tunables are set at factory defaults
- Validate successful Logon from one client
- Ensure Channel Node connection; does not include redistribution of channel connections or ensuring a proper fault tolerant design
- Certify that TTU software functions properly (e.g. BTEQ, ARC, Fastload, Multiload)

2.4. Post installation

- Verify subsystems
- Test LAN connectivity
- Run audit script and start RESCRIBE utility
- Monitor RESCRIBE
- Cleanup any problems uncovered by RESCRIBE
- Run Checktable and Scandisk
- Troubleshoot and correct any faults
- Verify successful logon from one client
- Complete system acceptance checklist

Attachment 10

Host Group Configuration Services Statement of Work

1. NATURE OF THE PROJECT

The State has requested that a second host group be created on its Teradata systems to facilitate encryption of end-user network traffic for the Teradata environment. The State intends that all end-user network traffic will traverse the first host group's related network and will have encryption enforced at the gateway while all backup and restore (BAR) network traffic will traverse the second host group related network and will remain unencrypted. The State is intending to keep the BAR related traffic unencrypted as they have found that encrypting the traffic is currently causing an unacceptable increase in backup elapsed time for the weekly full backups.

Teradata will perform Host Group Configuration Services for the State Production, Dev/DR, and Test Systems, (TPA nodes only) by adding a new host group to each Teradata system as described in the Teradata Security Administration Manual section: "Restricting Logons By Host Group".

- The State of Michigan security group is requiring the encryption of end-user network traffic for the Teradata environment.
- The means to this end will be to add a new host group to each Teradata system as described in the Teradata Security Administration Manual section: "Restricting Logons By Host Group".
- The State of Michigan has three Teradata systems:
 - 2 Node 2800 Test System
 - 2+1 6800H Dev/DR System
 - 2+1 6800H Production system.
- BAR network traffic is to be unencrypted at the gateway for the New Systems.
- Non-BAR network traffic is to be encrypted at the gateway for the New Systems.

2. SERVICES

The description of the general services consists of the following:

- Teradata will prepare change control and obtain proper internal approvals
- Teradata will identify interfaces that PUT can see and determine which interfaces need to be assigned to which Host Group.
- Teradata will verify there are no interfaces that will need to be configured that PUT does not have any knowledge of.
- Teradata will identify the number of Gateway processes required per node for the new Host Group id.
- Teradata will identify the number of PEs per node required to support the new Host Group ID Teradata Customer Service representative configures the database to define multiple hosts using the Configuration utility ADD HOST command. Each host must include the same vprocs as the corresponding host group in Vconfig.
- Planned Implementation Process:
 - The Test System will be the first system.
 - The Dev/DR System will be the second system.
 - The Production System will be the third system.

3. DEPENDENCIES & CLIENT RESPONSIBILITIES/ PERSONNEL

3.1. Optum's obligations are dependent and conditioned upon the following dependencies being satisfied:

- The network administrator assigns multiple aliases (tdpids) to the Teradata Database system, and maps each tdpid to a set of COP names and IP addresses, which corresponds to a configured host group.
- The network administrator assigns a Teradata client or group of clients to a single tdpid that corresponds to a host group.
- The State will test after each system implementation before allowing Teradata to proceed to the next one in the order of systems listed above. Teradata will not perform the testing.
- The State will implement encryption for the end-users' host group at the gateway. Teradata will not implement the encryption at the gateway.

This solution will segregate the end users' network traffic from the BAR jobs' network traffic but is not a perfect solution in forcing a user to go to the host group that will involve encryption. That is, an end user who learns the IP address for the host group without encryption could try to log in there. Thus, the State may restrict logons to specific hosts for the end users via IP filters.

4. OUT OF SCOPE SERVICES; EXCLUSIONS

4.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 10. Services that are outside the scope of this Attachment 10 include, but are not limited to, the following:

- Changing O/S tuning parameters to optimize performance
- Changing Teradata tuning parameters to optimize performance
- Changing BAR tuning parameters to optimize performance
- Installation of Application software
- Installation of client software
- Installation of host software (utilities)
- This will not increase the speed of the unencrypted BAR jobs.

Attachment 11

Data Migration Services Statement of Work

Data Migration Services Description

1. Nature of the Project

The Data Migration Service provides a fast, safe, powerful means to migrate data from one system to another. Teradata will perform two (2) NPARC's on each of the 2+1 6800 (New Production System and New Dev/DR System) and the 2n 2800 (New Test System).

2. PROJECT-SPECIFIC DATA MIGRATION SERVICES

- 2.1 Teradata will provide the following Services as part of data migration services under this SOW ("Data Migration Services"):
- 2.1.1 **Audit** - Your current data warehouse environment:
 - Identify Teradata version levels of both systems
 - Verify software packages
 - Determine database table clustering
 - Determine the amount of data to be migrated
 - 2.1.2 **Review and Evaluate** - Identify the optimal migration path, considering the current hardware environment, the database environment and the amount of data to be migrated
 - 2.1.3 **Change Control Management.** Teradata will develop a comprehensive change control plan outlining the steps necessary for this change ("Change Control Plan"). Teradata will perform the following activities:
 - Estimate time frames
 - Determine sequence of events
 - Identify product and technical dependencies
 - Identify roles and responsibilities
 - 2.1.4 **Perform Data Migration.** Teradata will migrate an estimated 25TB from the State of Michigan existing 5650 Production System to the new State of Michigan 6800 Production System. Both systems are located in the same customer facility. Teradata will connect the two systems node to node or utilize client provided network to:
 - Connect the two systems node to node
 - Optimize NPARC scripts based on table clustering and migration evaluation
 - Execute NPARC scripts
 - Monitor the data migration progress
 - Perform post-migration table de-clustering as appropriate
 - Perform data conversion as appropriate
 - 2.1.5 At the completion of the data migration project, Teradata will remove the NPARC scripts from the State system(s), disconnect and remove any special hardware such as custom cables and network cards that were installed specifically for the data migration.

3. PROJECT-SPECIFIC DELIVERABLES

Teradata will provide the following Deliverables under this Attachment 11:

- 3.1 Site Preparation Requirements - Identifies any steps the State of Michigan may be required to take to prepare the site for any Data Migration specific hardware and software installation.
- 3.2 Final Customer Report - Report documenting the project and the information gathered during the engagement.

4. PROJECT-SPECIFIC DEPENDENCIES & YOUR RESPONSIBILITIES/PERSONNEL

Optum and Teradata's agreement to this Attachment 11 and their duty to perform in accordance with this Attachment 11 are dependent and conditioned upon the following dependencies being satisfied, upon the State being responsible for and completing the following engagement-specific responsibilities, and upon the State providing the following personnel resources:

- 4.1 Dependencies and Your Engagement-Specific Responsibilities include:
 - 4.1.1 You will provide access to your network(s) and system(s), as necessary, to allow Teradata to perform the contracted Services.
 - 4.1.2 Customer Site Prerequisites
 - a) Customer agrees to meet the site prerequisites that may be required to enable Teradata to perform the *Data Migration Service*
 - b) Responsible for performing software version level synchronization, if required, on existing systems
 - c) Provide facility, workspace, system and dial-in access for Teradata as required
 - d) Allow read access to all of DBC
- 4.2 The State's Personnel Required for the Project include:
 - 4.2.1 State Resource #1---- State of Michigan Project Manager
 - a) Available to meet regularly with Optum and Teradata personnel on matters pertaining to this project.
 - b) Procure, manage, and direct State resources as requested by the Teradata Consultant and as defined in this Statement of Work.
 - c) Has sign-off authority for the completion of this project.
 - 4.2.2 Your Resource #2---- State Management Representative
 - A first-level manager who is familiar with the daily business operations, administration, and management of the State's information systems unit.
 - 4.2.3 Your Resource #3---- State Subject Matter Experts (as appropriate)

5. PROJECT-SPECIFIC EXCLUSIONS

The following items are excluded from the scope of Teradata's responsibilities under this Data Migration Services engagement Attachment 11 where Teradata may address some or all the following items as a customized engagement:

- Migration of Merchant Databases (i.e. non-Teradata)
- Migration of specific OS file systems
- Hardware or software installation other than specific components required for data migration
- Customized and/or application-specific migration strategies

Attachment 12

BAR Services Statement of Work

1. NATURE OF THE PROJECT

1.1. The description of general nature and scope of the Project is:

To provide the services needed to connect the customer owned and managed Enterprise BAR to the New Production, Dev/DR, and Test Systems (Enterprise Fit).

2. SERVICES

2.1. Backup/Archive/Restore Implementation

- Install the Teradata provided BAR software (Tape Management Software and/or Teradata Extensions).
- Verify local File System Backup
- Install Teradata Tools and Utilities
- Install Teradata Access Module
- Validate the BAR system capability through the execution of a functional test suite
- Run backup test to achieve optimal data throughput
- Create archive job for full Teradata database backup
- Create example archive and restore jobs for a single Teradata database and a single table

2.2. Backup/Archive/Restore Consultation

- Consult with the State on the BAR tuning and strategy options to meet the State's data protection needs.
- Discuss best practices for backup job scheduling, tape or disk management, and data restoration.
- Create archive job(s) for full Teradata database backup per the documented strategy session.
- Document your BAR solution in a summary report at the conclusion of the BAR Consultation and Training Phase.

3. PROJECT-SPECIFIC DELIVERABLES

3.1. Teradata will provide the following Deliverables under this Statement of Work:

- **Pre-Implementation Checklist** - Identifies the preparations which need to be completed at the site prior to our arrival in order to ensure a smooth and successful BAR engagement upon our arrival.
- **Implementation Agenda** – Provides the time frame for the engagement, based on the assumptions documented in this statement of work, including the availability of identified project resources.
- **Final Customer Report** – Documents various BAR project and solution information. The final report will be provided at the conclusion of the project and will include an overview of the activities performed during the BAR engagement. It will include information about the installed software and hardware, definitions of jobs created during the strategy session, a diagram of the BAR solution and a list of your employees who participated in the training session.

4. OUT OF SCOPE SERVICES; EXCLUSIONS

4.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 12. Services that are outside the scope of the Attachment 12 include, but are not limited to, the following:

- The solution of any problem originating from the quality of the data.
- Training of other people that are not State Project Team members.
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery
- Installing client software (except on system nodes)
- Upgrading host software
- Changing the non-Teradata Operating System tuning parameters to optimize performance
- Backing up and restoring data (archive and restore)
- Performing capacity validation (data, BYNET, processor)

Attachment 13

De-installation Services Statement of Work

1. NATURE OF THE PROJECT

- 1.1. Teradata's Deinstallation service provides the resources and expertise to coordinate the resources and tasks required to deinstall the State's Current Production, Dev/DR, and Test Systems.

2. SERVICES

The Services consist of the following functions:

- 2.1. **Audit.** During the System hardware inventory, Teradata will audit the State's current data warehouse ("Teradata") environment, identifying:
- Teradata version level
 - UNIX, Linux, MS-NT, and MS Windows Operating System version level
 - Version levels of Teradata clients and utilities
 - Teradata hardware firmware levels
- 2.2. **Change Control Management.** Teradata will develop a change control plan outlining the deinstallation steps. Teradata will perform the following activities:
- Estimate time frames and sequence of events
 - Identify product and technical dependencies
 - Identify roles and responsibilities
- 2.3. **Deinstallation.** Teradata will develop a plan outlining the deinstallation activities. Teradata will perform the following activities as applicable:
- Run Scandisk and Checktable utilities to verify system integrity
 - Remove all Disk Drives and turn over immediately to a State employee who will be monitoring the disk removal process
 - De-Install the AWS and the Teradata system
 - Prepare for deployment or relocation

3. PROJECT-SPECIFIC DELIVERABLES

The Deliverables for this Project are:

1.	Change Control Plan
2.	Deinstallation
3.	Activity Completion & Turn-Over

Teradata will develop a detailed Change Control Plan for the Deinstallation. This plan will be provided not less than 7 days prior to the start of the activity.

Teradata will provide a detailed Project plan for all phases of the Deinstallation activities prior to the start date, manage the required resources, and conduct periodic Project updates.

4. OUT OF SCOPE SERVICES; EXCLUSIONS

- 4.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 13 and the Project Plan.

Attachment 14

Disposal Services Statement of Work

1. NATURE OF THE PROJECT

- 1.1. Teradata's Disposal service provides the resources and expertise to coordinate the resources and tasks required to properly dispose the already de-installed Current Production, Dev/DR, and Test Systems.

2. SERVICES

The Services consist of the following functions:

- 2.1. **Audit.** During the System hardware inventory, Teradata will audit Client's current data warehouse ("Teradata") environment, identifying:
 - Equipment Inventory
- 2.2. **Change Control Management.** Teradata will develop a change control plan outlining the disposal steps. Teradata will perform the following activities:
 - Estimate time frames and sequence of events
 - Identify product and technical dependencies
 - Identify roles and responsibilities
- 2.3. **Disposal.** Teradata will manage the removal of the de-installed system from customer site. Teradata could choose to inventory it or recycle it.

3. PROJECT-SPECIFIC DELIVERABLES

Teradata will develop a detailed Change Control Plan for the Disposal. This plan will be provided not less than 7 days prior to the start of the activity. Teradata will provide a detailed Project plan for all phases of the Disposal activities prior to the start date, manage the required resources, and conduct periodic Project updates.

4. OUT OF SCOPE SERVICES; EXCLUSIONS

- 4.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 14 and the Project Plan.

Attachment 15

Hardening Services Statement of Work

PROJECT NAME/ID: IRS SCSEM OS System Hardening Services

1. NATURE OF THE PROJECT

Optum, via our subcontractor, Teradata Government Systems, LLC ("Teradata"), will perform Hardening Services for the new Production, Dev/DR, and Test Systems, including all servers delivered as part of the new Systems which are defined in more detail below:

1. 2+1 6800 Production System and its related VMS, Viewpoint, and BAR Servers (6 Servers);
2. 2+1 6800 Dev/DR System and its related VMS, Viewpoint, and BAR Servers (6 Servers);
and
3. 2 Node 2800 Test System and its related VMS Server (3 Servers).

2. PROJECT START AND END DATES

- 2.1 The Start and End Dates will be mutually agreed by Optum, the State, and Teradata as part of the overall Implementation Services and related Project Planning.

3. SERVICES DESCRIPTION

3.1 Operating System (OS) Level Security Hardening Service

Teradata personnel will harden the Systems in accordance with the most current IRS OS SCSEM requirements through configuration changes where possible. These requirements will also cover the OS Hardening requirements defined for NIST SP 800-53 and CMS. Any code and/or software changes required in order to meet the security requirements are not covered under this scope of work. When operational changes are required in order to meet the security requirements, Teradata will identify them and provide the information to State resources for implementation. Operational changes may include password policy changes on all platforms, keeping up the platform baseline, having a process to secure the environment where the platforms are located, etc. Configuration changes to meet the security requirements will be documented and provided to the State at the completion of the Hardening Services.

3.2 The following is a list of tasks to be performed by the Teradata Security Specialist as proposed.

- Review OS system configuration settings, vulnerability scan results and OS level information security issues with the State
- Disabling unnecessary services and protocols
- Limiting access rights to critical system files and services to only what is required
- Provide system hardening report identifying system changes
- Create a baseline for returning system to the same state after software upgrades for comparing current state over time to established baseline configuration
- Implementation and testing of custom or unique OS level security configurations

3.3 The scope of work for the OS level Hardening Services is limited to the following platforms (15 systems/servers total) and based on the following assumptions;

1. 2+1 6800 Production System and its related VMS, Viewpoint, and BAR Servers (6 Servers);

2. 2+1 6800 Dev/DR System and its related VMS, Viewpoint, and BAR Servers (6 Servers);
3. 2 Node 2800 Test System and its related VMS Server (3 Servers);

3.4 Assumptions:

- All Hardening Services will be performed remotely and the State agrees to provide Teradata remote access to the systems being hardened
- No other system/servers not specifically mentioned above are included for the Hardening Services
- Integration with the State's Single Login is not included in the Hardening Services
- Integration and testing with external Directory Services or Active Directory for user Authentication or Authorization are not included in the Hardening Services
- Teradata provides SSL equivalent network traffic encryption between client and server or server to server (BI tool, ETL, BAR, etc.) but does not use the SSL (which was primarily designed for web browser/web server network traffic encryption)
- Integration and testing for User Authentication using RSA Secured tokens is not included in the Hardening Services

4. DELIVERABLES

4.1 The following Deliverable will be provided:

System Hardening Audit Report (IRS OS SCSEM Format)

The Teradata consultant will prepare and deliver a System Hardening Audit Report which will include:

1. Analysis of the State's vulnerability scan report
2. Identification of items requiring remediation by operating system hardening procedures
3. Ranking of items requiring remediation by risk category
4. Identification of false positives for which remediation by the operating system hardening procedures is not recommended and why
5. Summarization of operating system hardening procedures used to perform the recommended remediation.

Optum will present the State with a deliverable acceptance letter upon completion of the deliverable. The criteria that must be met for the deliverable to be accepted is whether the deliverable contains the above content.

5. DEPENDENCIES & OPTUM & STATE RESPONSIBILITIES/ PERSONNEL

5.1 Teradata's and Optum's agreement to perform these services are dependent and conditioned upon the following dependencies being satisfied, upon Optum and the State being responsible for and completing the following engagement-specific responsibilities, and upon Optum and the State providing the following:

5.2 Dependencies and responsibilities consist of:

- The State Granting Teradata personnel remote access to the Teradata DBC, and the Linux Root or Windows Administrator.

5.3 State Personnel required for the Project include:

Project Manager

A project manager who is available to meet regularly with Teradata personnel on matters pertaining to this project, able to procure and direct State resources as requested by the Teradata Consultants.

Information Systems Representative

A manager who is familiar with the administration and workings of the State's DTMB group, and who is versed in the operation and management of the Teradata systems.

6. OUT OF SCOPE SERVICES; EXCLUSIONS

6.1 The Services to be provided by Teradata include only what is expressly described in this Attachment 15. Services that are outside the scope of this Attachment 15 include, but are not limited to, the following:

- Reengineering of processes
- The solution of any problem originating from the quality of the data
- The design or development of applications to create non-existent data or to modify current data
- The construction of a dictionary of current data used to populate one or more databases
- Training of other people that are not State project team members
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer
- Complex analytical processing not included as part of a Teradata-provided solution's functionality
- Security hardening of any other servers not specifically identified above.

Attachment 16

TASM Update Services Statement of Work

PROJECT NAME/ID: Teradata Active System Management (TASM) Services

1. NATURE OF THE PROJECT

TASM Workload Management Update Services include an assessment of the new environment and updating of the TASM Rule sets for the new Production System (Teradata 6800).

2. PROJECT START AND END DATES

- 2.1. The estimated Start Date for Teradata's performance regarding the Project is: The Start Date will be mutually agreed by Optum, the State, and Teradata.
- 2.2. The estimated End Date for Teradata's performance regarding the Project is: The End Date for project will depend on the State's migration plan.

Optum and Teradata will work with the State on the exact dates and the schedule for the implementation.

3. SERVICES

The Services consist of the following:

1	TASM Features Assessment
2	Update Workload Definition Implementation on the State's new Production System
3	Production System Workload Performance Monitoring and Adjusting
4	Mentoring member of the State's DBA Staff

- 3.1. The TASM Features Assessment portion of the service utilizes performance data on the State's Teradata system. This data is extracted from DBC Query Log history, AmpUsage, and Resusage tables. The Assessment reviews performance data against the new TASM features, and determines which additional features would be beneficial for the State. Implementation recommendations are then provided.
- 3.2. Update Workload Definition Implementation on the State's Production System consists of entering new settings into the Workload Manager component on the Production System. This is done by working directly with the Viewpoint Workload Designer graphical user interface.
- 3.3. Production System Workload Performance Monitoring and Adjusting involves the consultant and designated State person observing system performance using Viewpoint interactive reports, evaluating DBQL/system performance data and changing Workload Management settings if the target goals are not being achieved.
- 3.4. Mentoring a member of the State's DBA staff consists of providing knowledge transfer on the process during the engagement for a member of the State's project team so that they

understand the process and tasks. This is not a formalized training session but a one-on-one review of the activities performed.

4. DELIVERABLES

The Deliverables for this Project are:

1	Working implementation of Teradata Active Systems Management on SLES 11 including new features.
2	A presentation summarizing the engagement goals, results and recommendations
3	A TASM Overview slide set that can be used to train State personnel.

- 4.1. A Working implementation of TASM involves establishing the appropriate Teradata Workload Manager settings for workload definitions and exception processing using the SLES 11 architecture. New features will be highlighted, reviewed, and implemented.
- 4.2. The presentation summarizing the engagement will include the following:
 - 4.2.1. The defined workload of the customer
 - 4.2.2. Detailed settings for the Teradata Viewpoint Workload Designer.
 - 4.2.3. The benefits of implementing new TASM features
 - 4.2.4. Reports derived from the analysis completed during the engagement that illustrate customer workload groups and summarize their performance before and after workload definition changes
 - 4.2.5. A recommended action plan, or next steps, for the customer
- 4.3. The TASM Overview slide set generally describes all the features of Teradata Active Systems Management including the Teradata Workload Manager and the various exceptions and thresholds that can be defined to manage mixed workloads on the State's Teradata systems.

5. DEPENDENCIES & STATE RESPONSIBILITIES/ PERSONNEL

- 5.1. Optum and Teradata's agreement to this Attachment 16 and its duty to perform in accordance with this Attachment 16 are dependent and conditioned upon the following dependencies being satisfied, upon the State being responsible for and completing the following engagement-specific responsibilities, and upon the State providing the following personnel resources:

- 5.2. Dependencies and responsibilities of the State include:

In addition to those responsibilities listed in Part B, sections 3.2 through 3.5, the State must provide the following for the Teradata consultant:

- Logistics information
- Dress Code information
- Access to building (Contact info, badge etc)
- Meeting Rooms for Initial Day of briefings and interactive sessions (5 hours)
- Work Space for Teradata consultant(s) during project

- USB port to transfer data files
- TD client software
- Excel 2003 or later
- TD client software
 - SQL Assistant
 - Teradata Administrator
 - TTU 8.1
- Access to the State's network and Teradata systems either through a State provided workstation or LAN connectivity for the Teradata consultant's laptop.
- Ability to print
- State Database Administrator activities performed as assigned, including:
 - Providing Teradata system logins, database access on production performance data databases (DBC and DBCMngr), access to Priority Scheduler, Teradata Dynamic Workload Manager, and Teradata Manager application interfaces and build respective application database if they do not already exist
 - Teradata Viewpoint access and administrator access rights – needed for Viewpoint Workload Designer
 - The State has established Account String Identification and complete DBQL logging used to identify Workload/performance groups.
 - Access to Priority Scheduler settings, historical schmon data and historical AWT data.
- DBQL logging should be in place for a minimum of three weeks for the specific application users or database, at a minimum, and continue during the project.
 - If the State is at database release TD 13 and above
 - Log DBQL at the system level using detail logging with the following statement:
 - BEGIN Query Logging with SQL, Objects, StepInfo, Explain LIMIT sqltext=0 ON ALL;
 - Then log true Tactical usage at the account, appid, or userid level using the following example:
 - BEGIN QUERY LOGGING with SQL, Objects LIMIT Threshold =100 CPUTIME ON ALL ACCOUNT = '\$M1\$WXYZ&S&D&H';
- ResusageSpma should be enabled at least three weeks prior to the engagement. Collection rate at 60 and logging rate at 600.
- Activate ResusageSPS with Active Row Filter Mode on.
 - Agreement that Teradata Viewpoint Workload Designer settings will only be established to solve specific problems per the Consultants recommendations.

5.3. State Personnel required for the Project include:

- I/T management for initial and final presentations. I/T management is described as the person who is ultimately responsible for the performance of the data warehouse on a day to day basis.
- One or more Business Subject Matter Experts are required for the initial presentation and interactive sessions to discover workload descriptions and priorities. They also must be available to answer questions that arise during the engagement. Subject Matter Experts are the business person or group (sometimes a Database Administrator

can serve in this role) that can help define the various workloads with information such as:

- When each workload runs
 - Concurrency
 - Types of business questions
 - Urgency of business questions
 - Known and perceived Service Level Agreements (SLAs)
 - Policies for handling runaway queries
- One or more DBA's – defined as a Database Administrators. This DBA will work with the consultant in a mentoring relationship. This person will have the State side responsibility for implementing the workload management scheme. A State backup person, if assigned, should attend meetings, review the overview slide set, and meet with the primary DBA designee separately to review activities.

6. OUT OF SCOPE SERVICES; EXCLUSIONS

6.1. The Services to be provided by Optum and Teradata include only what is expressly described in this Attachment 16 and the Project Plan, once approved by both parties. Services that are outside the scope of this Attachment 16 include, but are not limited to, the following:

- Reengineering of processes.
- The solution of any problem originating from the quality of the data.
- The design or development of applications to create non-existent data or to modify current data.
- The construction of a dictionary of current data used to populate one or more databases.
- Training of other people that are not State Project Team members.
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer.
- Complex analytical processing that is not included as part of a Teradata-provided solution's functionality.

Attachment 17
Performance and Reporting Services Statement of Work

PROJECT NAME/ID: Performance Data Collection and Reporting Upgrade Service

1. NATURE OF THE PROJECT

1.1. The description of the general nature and scope of the Project is:

The Performance Data Collection and Reporting Upgrade Service is a Teradata Professional service that quickly enables Teradata Customers to Upgrade from a previous version of the Data Collection intellectual property (IP) to the newest version. With every upgrade to a major version of Teradata, the IP needs to be reinstalled. Once the Data Collection and Reporting database and processes are reinstalled, the service includes time for training a State DBA on the new IP and updates to the reporting toolkit.

All Performance Data Collection computer-coded Deliverables ("PDC Deliverables") left at the Site after completion of this project (including Documentation for them) by Teradata under this SOW, such as:

- Create database scripts
- Create user scripts
- Create table scripts
- Load macros
- Reporting macros
- Views
- BTEQ scripts
- AWK scripts

are the Confidential Information and copyrighted intellectual property of Teradata; are not subject to, eligible for, or covered by Teradata ESS/Maintenance and Support coverage or Subscription coverage; and, are licensed to the State only for its internal business use, only for use or in connection with the Equipment on or in connection with which the PDC Deliverables are initially to be used, and otherwise subject to the terms of the Contract.

The State may, however, unless the Contract expressly provides otherwise, use third-party contractors to operate, use or modify PDC Deliverables, but only on behalf of and for the benefit of the State, only for the State's internal use, and only on or in connection with the Equipment for which the PDC Deliverables were initially used, provided that the State assures that the third-party contractor is aware of and agrees to comply with the applicable license restrictions and to the protections applicable to Teradata's Confidential Information as set forth in the Contract; but, Teradata shall not be responsible for, and Teradata's warranties on PDC Deliverables do not apply to or cover, any use, operation or modification of PDC Deliverables by anyone other than Teradata (or its employees, suppliers or subcontractors acting on Teradata's behalf).

If/when the State upgrades the version/release of the Teradata database Software against which the PDC Deliverables will be run or otherwise changes or incurs changes to the Equipment/Software system against which the PDC Deliverables will be run, the State shall be solely responsible for making, or arranging to make (e.g., hiring Teradata through an additional, separate Professional Services engagement to make), any changes to the PDC Deliverables that may become necessary or desirable as a result of such upgrade or change, such as changing scripts which extract data from Teradata database Software dictionary tables in order to make the PDC Deliverables functional, compatible and/or optimized with the new version/release of the Teradata database Software.

This is a (3-4 day) service and will not include a presentation at the end but will include a status update. This service is specifically to update the service objects only.

2. PROJECT START AND END DATES

- 2.1. The estimated Start Date for Teradata's performance regarding the Project is: The Start Date will be mutually agreed by Optum, the State, and Teradata.
- 2.2. The estimated End Date for Teradata's performance regarding the Project is: The End Date will be approximately 3-4 days after the Start Date.

3. SERVICES

The Services consist of the following:

1	Performance Data Collection and Reporting Upgrade – Test System
2	Performance Data Collection and Reporting Upgrade – Production System
3	Mentoring

- 3.1. Performance Data Collection and Reporting Upgrade – Dev/DR System – The Performance Data Collection and Reporting Upgrade service performs the following tasks:
 - Uninstall of old / Install of new Teradata Performance Data Collection and Reporting Database which includes tables, views, maintenance and reporting macros on the State's test and production systems.
 - Mentoring on the analysis process using the reporting macros for the State's DBA with the performance data provided by this service
- 3.2. Performance Data Collection and Reporting Upgrade – Production System – The Performance Data Collection and Reporting Upgrade service performs the following tasks:
 - Uninstall of old / Install of new Teradata Performance Data Collection and Reporting Database which includes tables, views, maintenance and reporting macros on the State's test and production systems.
 - Mentoring on the analysis process using the reporting macros for the State's DBA with the performance data provided by this service
- 3.3. Mentoring - provided during the engagement for a member of the State's project team in order to transfer knowledge on the process and reporting toolkit so that they understand it and all tasks involved. This is not a formalized training session but a one-on-one review of the activities performed.

4. DELIVERABLES

The Deliverables for this Project are:

1	Project Activity List
2	Performance Data Collection and Reporting database and process implementation

- 4.1. The project activity list describes the sequence and effort that is planned for a project along with assigned personnel scheduled to perform the work.
- 4.2. Performance Data Collection and Reporting database and daily collection process implementation that consists of:
 - Creation of Performance Data Collection and Reporting database objects
 - Approximately 51 Tables and the scripts to create them
 - Approximately 74 Views and the scripts to create them
 - Approximately 59 Report and 63 Load/Purge Macros for reporting and maintenance functions and the scripts to create them
 - Approximately 12 users, databases, roles and profiles with create DDL scripts
 - Approximately 12 each .BAT and BTEQ SQL files for load/purge jobs
 - Files for creating a tailored Canary Query process complete with tables populated with sample data.
 - Documentation consisting of Installation and User Manuals, Reporting Toolkit and Higa Report toolkit (Microsoft Excel), and two Power Point presentations
 - Implementation of daily collection process to load and maintain the performance Data Collection and Reporting database
 - Mentoring on the analysis process for the State's DBA using the performance data provided by this service

Note: Any State requests for modifications or additions to the normal service or the Intellectual Property installed as part of it, constitute additional work and can be done only as part of a separate services agreement.

5. DEPENDENCIES AND STATE RESPONSIBILITIES/ PERSONNEL

- 5.1. Optum and Teradata's agreement to this Attachment 17 and its duty to perform in accordance with this Attachment 17 are dependent and conditioned upon the following dependencies being satisfied, upon the State being responsible for and completing the following engagement-specific responsibilities, and upon the State providing the following personnel resources:
- 5.2. Dependencies and responsibilities of the State include:
 - The State must provide the following for the Teradata consultant:
 - Logistics information
 - Dress Code information
 - Access to building (Contact info, badge etc)
 - Meeting Rooms for Initial Day of briefings and interactive sessions (2 hours)
 - Work Space for Teradata consultant(s) during project
 - USB port to transfer data files
 - TD client software
 - Access to the State's network and Teradata systems either through a State provided workstation or LAN connectivity for the Teradata consultant's laptop.
 - Ability to print.
 - State Database Administrator activities performed as assigned, including:
 - Creation of Teradata PDCRADM Performance Database collection database under the DBCManager or DBC user with minimum of 50 meg per amp of space allocated
 - Providing Teradata access to the DBCManager user login that should have full access rights on the PMCPADM or PDCRADM database and select, delete and

execute macro access to Teradata system production resource consumption databases (typically DBC and DBCMngr for Teradata Manager)

- The State must use Teradata Manager and have a Teradata Manager server.
- The State must have a Linux server for PDCR implementations with BTEQ installed.
 - If Viewpoint server(s) are to be used the State must install BTEQ and associated communication packages prior to engagement start date.
 - If Viewpoint PDCR portlets are desired by the State, the portlets must be installed by the State or Teradata Customer Services on the Viewpoint server(s).
- The State must provide access to Viewpoint.
- Information on current Teradata performance data gathering such as Logon/Logoff, AmpUsage, ResUsage, DBQL, Disk and Spool space, etc.
- Enable requested data collection such as ResUsage and DBQL.
- If a State workstation is required then it must have a USB port to transfer data files and MS Excel version 2003 or later. The Report Toolkit will not work on earlier versions.
- A State provided workstation must have TD client software including:
 - SQL Assistant
 - Teradata Administrator
 - Applicable Teradata Tools and Utilities (TTU) for the State's Teradata release being used on test and production systems
 - Teradata Manager for installations below Teradata 13.10

5.3. State Personnel required for the Project include:

- State Data Architect or Database Administrator

6. OUT OF SCOPE SERVICES; EXCLUSIONS

6.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 17 once approved by both parties. Services that are outside the scope of this Attachment 17 include, but are not limited to, the following:

- Reengineering of processes
- The solution of any problem originating from the quality of the data
- The design or development of applications to create non-existent data or to modify current data
- The construction of a dictionary of current data used to populate one or more databases
- Training of other people that are not State Project Team members
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer
- Complex analytical processing that is not included as part of a Teradata-provided solution's functionality
- Security hardening of any other servers not specifically identified in Section 4

Attachment 18

Teradata Business Critical ESS Services

1. INTRODUCTION AND SCOPE

This Attachment 18 describes the terms and conditions applicable to Teradata's Business Critical ESS Services.

2. SERVICES

Optum, via our subcontractor, Teradata, will provide the following Services:

2.1 Incident Requesting Service

- a) Teradata will provide the State with User access to Teradata's service portal, *Teradata @ Your Service* and where applicable, telephone information, for requesting Service if the State is experiencing a Problem with supported Products and will activate its Automatic Incident Creation Diagnostic Tool. A "Problem" is a failure of a Product to conform to its manufacturer's then-current, customer-level documentation.
- b) When the State requests Service, it must assign a priority for each Problem incident or Service request based on the criteria set out below. Teradata will assign a priority if the State fails to do so. The State agrees to give Teradata immediate unrestricted access to the System if an incident is assigned as Priority 1. If the State does not provide such access, Teradata will reclassify that Priority 1 incident to Priority 2 and respond accordingly. A single contact event for Service may be made up of multiple incidents or requests. A priority level will be assigned for each incident or request reported.

Priority 1: Critical - A Problem that prohibits use of the Product or renders the Product inoperable.

Priority 2: Significant - A Problem that causes a significant impact to the business; however, operations can continue in a degraded fashion.

Priority 3: Minor - A Problem that negligibly impacts the ability to do business.

- c) Customers with Internet access agree to report all Priority 2 and 3 incidents through *Teradata @ Your Service*. The State further agrees that Service Requests classified as a "Question" will be only be assigned a Priority 3. The State will receive an electronic confirmation of all incidents created via *Teradata @ Your Service*. Implementing an FRO (see Section 2.3(b)), a resolution to a reported Problem, or other remedial maintenance will not alter the Problem Priority.

2.2 Electronic Support and Communication. State-approved users ("Users") will be provided with a user ID and password for Teradata's service portals, which provide access to online resources, including *Teradata @ Your Service*, and a basic membership to Teradata Education Network ("TEN").

2.3 Equipment Services.

- a) **Services.** Teradata will first attempt to provide Remote Support for Problem resolution for Equipment covered by a Maintenance Order. If Teradata determines that the Problem requires On-Site Support for repair, Teradata will dispatch a service representative to provide On-Site Support. Teradata provides and installs replacement parts for all failed hardware components as part of the State's Teradata Business Critical ESS Service. Parts are replaced on an exchange basis and failed

parts become property of Teradata and replacement parts become the State's property.

- b) **Field Retrofit Order.** Teradata may release a field retrofit order ("FRO") for Equipment specifying changes that will improve safety, regulatory compliance or reliability of the Equipment. Teradata will install the modifications required by the FRO at no charge if the State allows such installation to occur within 6 months after Teradata releases the FRO. Teradata will install the FRO on a 7 day per week 24 hours per day basis. The State may find information about any FROs released for its Equipment on Teradata @ Your Service. Teradata will proactively inform the State of any safety-related FRO, and the State agrees to allow Teradata to install such safety FRO as soon as practical.

2.4 Software Services

- a) **Services.** Teradata shall provide remote Problem resolution Service for certified and supported Software covered by a Maintenance Order. Such Service consists of:
 - 1. Guidance in locating (via Teradata @ Your Service) solutions to known Problems, information to resolve procedural Problems and answers to frequently asked questions,
 - 2. Recommendations to upgrade if solution is available in a later software release,
 - 3. providing a temporary workaround procedure to circumvent a Problem until an e-fix/code-level change is provided, or
 - 4. Providing an e-fix/code-level change that resolves the reported Problem. E-fix/code-level changes will only be provided for supported releases of Database, Tools and Utilities/Client Software at Teradata's discretion. Service for those E-fix/code-level changes will be handled by the following priority levels:
 - Priority 1:** 7 days per week, 24 hours a day
 - Priority 2:** Monday to Friday 8 a.m. – 5 p.m. US Pacific Time Zone with P1 given priority
 - Priority 3:** Provided in next Software release
- b) **Teradata @ Your Service.** Users will have access to Teradata @ Your Service to report Problems and obtain Software patches, fixes, and maintenance release updates for some customer-installable Software, or (at State's request) Teradata will provide a single media copy at no additional charge. For Software patches and maintenance release updates that cannot be directly obtained, the necessary order information will be provided on Teradata @ Your Service. The State may replicate and/or apply the patches or maintenance release updates for each copy of the Software to which it pertains and for which the State has paid the applicable fees and licenses.
- c) **Software Release Naming Convention.** In general, Teradata utilizes the following naming convention for Software database releases. The types of releases are differentiated via the release/update number, X.Y.Z.n.
 - X - number refers to a major Software release upgrade
 - Y - number refers to a minor Software release upgrade
 - Z - number refers to a maintenance release update
 - n - number refers to fixes or patches"Service Pack" and "Hotfix" are the Microsoft names for software fixes. Following Teradata standards, a "Service Pack" is a maintenance release (Z) and a "Hotfix" is a patch (n).

- d) Software Release Support. Teradata will provide Software Problem resolution Services for a major or minor software release for no less than 36 months from General Customer Availability ("GCA"). GCA is the latest date that a version/release of the product is available to all users, regardless of language or media. Teradata may, at its discretion, support additional prior releases, but will not provide fixes or patches for such versions. Support terms for prior releases may vary from the terms of this Attachment 18 or an applicable Maintenance Order. Teradata will inform the State via Teradata @ Your Service at least 6 months prior to discontinuing Services or changing the level of Service available for a particular Teradata Software Product. For Third Party BAR Software, Teradata (i) will provide Software Problem resolution Services for the current and most recent prior maintenance release updates of the current major/minor software release upgrade, and (ii) may, at its discretion, support the final maintenance release update of the most recent prior major/minor software upgrades.
- e) For customer-installable Software covered by a Maintenance Order, Teradata will provide remote installation assistance consisting of (i) guidance in locating (via Teradata @ Your Service) solutions to known Problems, (ii) information to resolve procedural Problems, and (iii) answers to frequently asked questions. Without limitation, such Services do not include the following (which are considered out of scope and subject to Section 4 of this Attachment 18): (1) remote installation, (2) step-by-step installation consultation, (3) testing of State installed patches and maintenance releases, or (4) recovery of the Product or system after a failed installation performed by the State.

2.5 Customer Support Card. Teradata will provide a Support Card upon start of service that includes details of how to contact Teradata, certain support processes and basic customer responsibilities for obtaining Service. The Support Card may be modified at any time.

3. OPTIONAL SERVICE COMPONENTS

Following are Optional Components that are included with the State's Teradata Business Critical ESS Services:

3.1 State of Health Reporting. On a bi-weekly basis, Teradata will remotely run and review a "System Health Check" to identify potential errors. On a monthly basis, Teradata will send a summary of the findings to the State. "System Health Check" findings and recommendations will also be reviewed during "Operational" reviews described below. This Service does not apply to BAR Products.

3.2 Software Release Management.

- a) For the supported Software covered by a Maintenance Order, Teradata will review new maintenance release updates (Z) and fixes and patches (n) and recommend patches and releases that should be applied proactively to avoid possible failures on a quarterly basis.
- b) For supported non-Teradata branded Software covered by a Maintenance Order, Teradata will review applicable security patches on a quarterly basis. Teradata will not make recommendations to customers for Microsoft Hotfixes or Service Packs until certified by Teradata Engineering.

3.3 Critical Patch Review.

On a weekly basis, for each Teradata release of a critical technical alert, Teradata will review the technical alert and any corresponding patch information to determine its applicability to the State's environment. If Teradata determines that the patch should be

applied to the State's system, Teradata will notify the State that the patch is available and provide a recommendation as to when it should be installed.

- 3.4 Service Performance Reporting. Teradata will make available to the State, on a monthly basis via Teradata @ Your Service, a service performance report that identifies the response and resolution time for each incident submitted to a Teradata Service Center. The reports will provide statistics for all incidents opened and closed during the reporting period, including the number of incidents open at the start of the reporting period, the number opened during the reporting period, the number closed during the reporting period, and the number still open at the end of the reporting period. Additionally, a summary disposition will be provided for each incident closed during the reporting period, including the priority status of the call, average Problem resolution times, and the percentage of incident calls closed within the guidelines. Additional statistics will be included at Teradata's discretion. If the State does not have access to Teradata @ Your Service, a service performance report will be provided quarterly.
- 3.5 Customer Support Plan. Teradata will document the detailed support processes through which on-going Services will be delivered to the State including both the State's and Teradata's roles and responsibilities in those processes. The support plan will be reviewed with the State annually and updated as necessary by Teradata.
- 3.6 Support Reviews. For each contract year, Teradata will provide the State the following Support Reviews: one "Executive" per year. "Operational" review will, at a minimum, cover current Service performance, review summary results from any "System Health Checks", review critical technical alerts, and discuss potential future changes to the State's environment. The "Executive" review will, at a minimum, include a review of service performance statistics. The specific agenda, discussion points and the identity of participants from both Teradata and the State will be as mutually agreed upon. These reviews will be conducted remotely, via telephone unless an On-Site meeting is mutually agreeable.
- 3.7 Availability Management Reporting. Teradata will make available to the State, on a monthly basis, via Teradata @ Your Service, a system availability report that documents the database system's planned and unplanned availability and includes statistics for system maintenance, change control, customer induced activities, and unplanned down time affecting availability. Downtime, for the purposes of availability reporting, will commence when Teradata is informed by the State either verbally or through automated tools that their System is down and will continue until the Teradata login is restored. Time for data restoration and/or validation is not included in determining system availability. This report excludes BAR Product(s).
- 3.8 Assigned Customer Support Representative. Teradata will identify technical resources that will be specifically assigned to provide Teradata Business Critical ESS Services to the State ("Customer Support Representative"). The Customer Support Plan will identify these individuals by name, identify the specific roles and accountability in delivering Teradata Business Critical ESS Services, and provide direct contact information. For each Priority 1 Problem, a Customer Support Representative will conduct a "post mortem" analysis that includes a closed loop corrective action plan. Teradata will also proactively inform the State of any changes in Product support policy.
- 3.9 Change Control Management.
 - a) With the State's assistance, Teradata will develop and document a written change control plan, following Teradata's then-current implementation management and

processes outlining the implementation plan, test plan, back-out and recovery plan, and the responsibilities of both State and Teradata in implementing FROs and Teradata-installed Database and Operating System Software releases consisting of fixes and patches (n), maintenance release updates (Z), and minor release updates (Y). During such implementations, Teradata will provide Remote Support (or On-Site Support, at Teradata's discretion) throughout the implementation of the change control plan. This service does not apply to BAR Software Products.

- b) If, at the State's request, Teradata provides a change control plan for changes other than those in subsection a) above, or for State-installed releases (including Customer-installed patches (n) and maintenance releases (Z)), such change control plan is out of scope and subject to Section 4 of this Attachment 18.
- c) The State must provide Teradata at least 28 days advance notice of a change for Teradata to develop and approve the change control plan. Change control plans that are requested with less than 28 days notice are out of scope and subject to the Out of Scope section of this Attachment 18.

3.10 Installation of Software. Remote installation will be provided during the Remote and On-Site "Hours of Coverage" selected that apply to Priority 1 incidents, by Teradata for minor release updates (Y), maintenance release updates (Z), and fixes or patches (n) to the Teradata Database and the Operating System. Teradata may, at its sole discretion, perform such installations On-Site. On-Site installation of minor release updates (Y), maintenance release updates (Z), and fixes or patches (n) by Teradata outside the State's Priority 1 Remote or On-Site Support Hours of Coverage, or when installed On-Site at the State's request when the change is remotely installable, is out of scope and subject to Out of Scope section of this Attachment 18. This service does not apply to BAR Software Products.

3.11 On-Site Parts Option. Teradata will store a set of critical spare Parts for the Equipment at the State's site. These Parts will be in addition to Teradata's centralized stock of replacement Parts. The State agrees to store the On-Site Parts in a secure area to which Teradata personnel have unrestricted access. Teradata will periodically review the list of specific Parts being stored at the State's site. At Teradata's sole discretion, Teradata will determine whether to add or remove Parts based on their criticality and need.

3.12 Software Implementation (SWI) Annuity Option. Teradata will provide personnel who will provide remote implementation of Teradata and/or BAR Software releases for which the State has a valid license. SWI does not include identifying a specific target Software release to be implemented, and the State is responsible for identifying the specific Software release to be implemented. The installation shall take place during the Remote and On-Site "Hours of Coverage" selected that apply to Priority 1 incidents. All such implementations shall follow Teradata's then-current change control management and implementation process and are subject to the remote connectivity requirements.

- a) Teradata Database Platform. Teradata will provide remote implementation of Teradata database Software covered by a Maintenance Order. All such implementations shall follow Teradata's then-current change control management and implementation processes. At Teradata's discretion, any operating system or firmware updates or upgrades required to enable the implementation of the database may be performed as part of the database software implementation. The specific SWI annuity option is identified in Attachments 6, 7, and 8 for the New Production, Dev/DR, and Test Systems.

3.13 Disk Drive Retention Option. The State will retain possession of the disk drives that Teradata removes from the hardware during Services. Title to the removed disk drives will

remain with the State. Once removed from the hardware, the State shall be responsible for the retention and disposal of the disk drive, as well as compliance with all applicable laws or regulations that relate to the disk drive and/or the data contained on it.

4. OUT OF SCOPE (SEPARATELY CHARGEABLE) SERVICES; EXCLUSIONS

4.1 Out of Scope. Services not defined in this Attachment 18 are out of scope. Out of scope services include, but are not limited to:

- (i) systems integration
- (ii) services related to installation, de-installation, and movement of Product
- (iii) electrical work external to Product
- (iv) database implementation, population, and administration
- (v) execution of data loading procedures
- (vi) data archiving
- (vii) data recovery
- (viii) BAR system implementation
- (ix) modifying the Software to meet security requirements

4.2 Exclusions. Teradata will not be obligated to provide Services for:

- a) Equipment that has not been subject to Teradata warranty or maintained by Teradata for more than 90 days. If the State wishes to order Services for such Equipment, Teradata will, at the State's expense, perform an inspection and make any necessary repairs; and
- b) Problems resulting from the following causes: the State's or any third party's negligence, misuse, or abuse, including the failure to adhere to Teradata or Third Party BAR Product supplier's site preparation standards; failure to operate Products in accordance with Teradata's power, environmental, and other specifications or limitations agreed to by the Parties; failure to perform regular preventive maintenance activities (e.g., tape head cleaning); movement of Product by anyone other than Teradata or its representatives; improper use of or failure to use supplies meeting Teradata's or the manufacturer's specifications; software or modifications to Software (including security patches) that have not been approved or provided by Teradata; acts of third parties; third party products not under a maintenance agreement with Teradata; failure to comply with Third Party Product software licensing terms; fire, smoke or other hazards originating outside of Teradata-furnished Equipment; water; acts of God; power distribution failures (including use of hard-power down condition or emergency power off switch) that cause the specifications for Products not to be followed; damage ordinarily covered by insurance; alteration of Product and attachments not provided/approved by Teradata in writing or compatible with Teradata's standard interfaces; improper installations, implementation or operation of Product; or failure to perform those actions prescribed by Teradata; Problems originating from non-Teradata supported products and configurations; Product conversions and migrations; Product updates and upgrades unless specifically indicated in this Attachment 18.

4.3 Teradata will only perform out of scope services ("Additional Services") at the applicable out of scope services rate. Teradata will inform the State if a Service is out of scope prior to commencing work. However, Teradata will not perform Services on Products when it reasonably believes that doing so represents a safety hazard.

5. ELIGIBILITY FOR SERVICES

5.1 Product Adds / Moves. If the State intends to install additional Products to the same system, the State will place a separate Order for the same Services for such Products. For example, if the State has previously purchased 6 nodes including Teradata Business

Critical ESS Services and then purchases an additional 2 nodes for the same system, the State also will place an Order to cover the additional 2 nodes under Teradata Business Critical ESS Services.

- 5.2 The State will notify Teradata in writing at least 30 days before Equipment is moved, added, or removed from Service, or if the State changes the Hours of Coverage. This information will include the new location (with complete street address, city, state and zip/postal code, and new location number) and the effective date of the change. If the State does not provide the required notice, Optum retains the right to invoice the State for Additional Services resulting from any delays caused by such (including, for example, Teradata's technician being dispatched to a wrong location).

Attachment 19
Not Used

Attachment 20

Teradata Software Subscription

1. For Software covered by a Subscription Order, the State is permitted to order, at no additional charge, any major or minor releases that Teradata makes generally available for such Software, if any, provided that the State has paid all Subscription fees due at the time of such Order. The State's rights shall only apply to the Teradata platform Software (e.g., number of nodes, Equipment class, processing power, operating system) covered by the Order for Subscription. The license and other terms that apply to any releases provided under these Subscription terms shall be the same terms as apply to the original Software ordered. In the event the State's license to the original Software ordered terminates, Subscription to such Software also terminates upon the same effective date of termination.
2. Subscription is available only for Software that the State has currently licensed directly from Teradata but distributed by Optum to the State. Subscription is available only for certain Teradata Software and is not available for Third Party BAR Software. Upon the State's request, Teradata will inform the State of which Teradata Software is eligible for Subscription.
3. The State must ensure that the system(s) on which it may install the new releases of Software covered by Subscription are properly upgraded and have all necessary ancillary software to operate such new releases. If the State expands the platform system on which the Software covered by Subscription is installed, Optum will invoice the State for the additional amounts due to extend Subscription coverage to the expansion.
4. If the State has not had Software continuously covered by a Subscription Order since the State purchased a license for such Software that Optum conveyed to Customer, Optum may charge the State an additional Subscription fee to cover the time when no Order for Subscription was in place for such Software.

Attachment 21

OpenText BI Query Software Support

During the Renewal BI Query Software Maintenance Term defined below, Optum, acting through its subcontractor, Open Text Corporation ("OpenText"), shall provide "Standard Maintenance" for the BI Query Software. The scope of what constitutes "Standard Maintenance" is set forth in the OpenText Software Maintenance Program Handbook and further governed by the End User License Agreement terms which were both delivered with Change Request Proposal 018.

Renewal BI Query Software Maintenance Term

The term during which Optum shall provide BI Query Software Support shall commence October 1, 2016 and continue for a term ending twelve (12) months thereafter (the "Renewal BI Query Support Term"), provided that Optum receives a purchase order for the charge set forth in Attachment 4 – Cost Tables corresponding to the Renewal BI Query Support Term on or before September 30, 2016. The Renewal BI Query Support Term shall renew for successive twelve (12) month terms, provided that on or before the beginning of such twelve (12) month Renewal BI Query Support Term, and each twelve (12) month anniversary thereafter, Optum has received a purchase order from the State for the charge set forth in Attachment 4 – Cost Tables corresponding to the applicable Renewal BI Query Support Term. Notwithstanding the foregoing:

- (a) The State shall have the right to issue one or more purchase order(s) that cover more than the Initial Renewal BI Query Support Term, provided that the charge set forth in any purchase order issued by the State includes the total fee(s) set forth in Attachment 4 – Cost Tables corresponding to the duration of the purchase order;
- (b) Optum, with support from its subcontractor OpenText, will issue a revised quote on a yearly basis, prior to the Renewal BI Query Support Term, reflecting revised unit rates and total charges for Standard Support of the BI Query Software, consistent with the actual rate of increase from the subcontractor, OpenText, where such revised rates shall be deemed to have amended this Attachment 21. The charges in Attachment 4 – Cost Tables have been presented based on a maximum increase in rates of 10% per year; and
- (c) Optum shall have the right to terminate the BI Query Software Support either (i) at the end of a Renewal BI Query Support Term or (ii) at any point in time during the BI Query Support Term effective upon written notice to the State if (x) Optum's subcontractor, OpenText, no longer provides such BI Query Software Support or (y) OpenText changes the applicable support charge discount offered to Optum for the BI Query Software for a Renewal BI Query Support Term from that quoted to Optum as of the date of this Attachment 21 and the State elects not to accept the corresponding change in support charge from Optum within thirty (30) days of Optum's quotation thereof.

In the event that the BI Query Software Support is terminated prior to the end of the Renewal BI Query Support Term and if the State has paid Optum a fee that covers a portion of time following the effective date of termination, then Optum shall refund to the State a prorated amount of any prepaid charges or grant the State a credit, at Optum's sole discretion, but only if and to the extent Optum is entitled to a prorated refund of the fee it has paid to OpenText.

Attachment 22

Optum Symmetry Software

During the Renewal Symmetry Software Term defined below, Optum shall provide “Symmetry Software License and Support Services” for the Symmetry Software. The scope of what constitutes “Symmetry Software License and Support Services” is set forth below.

Symmetry Software License:

Optum hereby grants the State a nonexclusive, nontransferable license to use the following Symmetry software (the “Symmetry Software”). The Symmetry Software is included in the definition of “Software” used in the ‘109 Contract, and includes a nonexclusive license to use the Current Procedural Terminology (“CPT”) codes embedded therein.

- ❑ **Symmetry Episode Treatment Groups (ETG).** The Symmetry ETG Software is an episode building patient classification system methodology that uses inpatient and ambulatory claims, or other like data, to identify treatment episodes.
- ❑ **Symmetry Episode Risk Groups (ERG).** The Symmetry ERG Software predicts and assigns potential risk values to individual members of a health care plan, based in part on a derivative of ETG.
- ❑ **Symmetry Pharmacy Risk Groups (PRG).** The Symmetry PRG Software works in conjunction with Optum’s pharmacy mapping drug classifications algorithms for assigning potential risk values to patient populations for prospective analysis based solely on claims.
- ❑ **Symmetry EBM Connect.** The Symmetry EBM Connect Software is intended to help the State retrospectively measure and monitor the quality of care provided to its plan members by comparing services captured on medical claims, pharmacy claims and laboratory results data to recognized and established clinical guidelines. The Symmetry EBM Connect software includes only default cases and rules.

A. Rights to Use: The State’s right to use the Symmetry Software is limited to the uses stated in this Attachment 22.

1. Grouping Claims. The State may use the Symmetry Software at the sites defined below for the purpose of grouping of claims for which the State is the payer or third party administrator (TPA) (unless otherwise permitted below) and using any Symmetry Software output for the internal business activities of the State or the State’s payer or TPA customers, including use of the output for the purposes of medical cost containment and treatment analysis, and provider network analyses and management.
2. Value Added Reports. The State may use the Symmetry Software to create Value Added Reports. “Value Added Reports” means the State’s written analysis and interpretation of the results generated by processing any of the State’s own claims (if the State is a payer) or any one group’s claims through the Symmetry Software. Value Added Reports may be in the form of reports or analysis, paper or electronic, and may include the grouped data and identifiers generated by the Symmetry Software. The State may deliver Value Added Reports only to the employer group, other group or association, physicians, physician groups, or consumers whose claims were processed for such report.
3. Disclosure. Should the State desire to disclose any Symmetry Software output or Value Added Reports to a third party entity other than as described above, the State is required to notify Optum of the entity and scope of the project requiring the disclosure. If Optum agrees the State may make such disclosure, the State will ensure that the receiving entity signs a non-disclosure agreement with the State or with Optum which prohibits further uses or disclosures of the Symmetry Software output and Value Added Reports. The State will pay Optum any additional mutually agreed fees for such disclosure and project.

- B. Proprietary Rights: The State understands that the Symmetry Software and data derived from the Symmetry Software are protected under copyright laws and are the subject of United States patents. The State agrees to mark all Value Added Reports and other reports generated using the Symmetry ETG Software with the following:

“Portions of the Software are protected under United States Patents #5,835,897; #6,370,511; #7,620,560; #7,725,333; #7,774,216; and #7,979,290. Other U.S. and foreign patents pending. Recipient of this information may not disclose, permit to be disclosed, or otherwise resell or transfer all or any portion of this information to any third party.”

- C. Informational Tool: The Symmetry Software is provided to the State for informational purposes only. The State acknowledges that the Symmetry Software is a tool that the State may use in various ways in its internal business. Any reliance upon, interpretation of and/or use of the Symmetry Software by the State is solely and exclusively at the discretion of the State. The State's determination or establishment of an appropriate treatment plan, reimbursement level or fee is solely within the State's discretion, regardless of whether the State uses the Symmetry Software. Optum is not engaged in the practice of medicine and does not determine, on the State's behalf, the appropriate fee or reimbursement levels for the State and its business. The State shall not use the Symmetry Software to perform medical diagnostic functions, set treatment procedures or substitute for the medical judgment of a physician or qualified health care provider.

- D. State of Michigan Obligations: The State agrees to acquire, install, implement and maintain all services, hardware, software, networks, program fixes, program releases, operating system software, database software, and other third-party software, as deemed necessary by Optum for proper execution of the Software. Such items may be at an additional cost for which the State is financially responsible. Optum shall not be responsible for installation or support of third-party components or for circumstances beyond its reasonable control. The State shall not deliver the Symmetry Software to any third party for such third party's use, even if such third party use is on behalf of the State. Under no circumstances does this license allow for the access to or distribution of the Symmetry Software's executable programs, codes, or related documentation to any entities outside of the site(s).

- A. Software Delivery. Optum will make available to the State one (1) master copy of the Symmetry Software. Such copy of the Software shall be in an electronic form and suitable for reproduction by the State in support of the State's permitted uses of the Symmetry Software including installing for purposes of hosting both a test/preview site and a production site. The State may use the Symmetry Software at the following location (the “Primary Site”): State of Michigan Lake Superior Data Center located at 7064 Crouner Drive, Lansing, MI 48821.

- B. Future Sites. Optum and the State agree that future installation sites may be added under this Schedule as mutually agreed upon by both parties in writing and at an additional cost (other sites and the Primary Site are collectively the “Sites”). For purposes of reporting and calculation of fees due under this Schedule, the Primary Site shall be responsible for coordinating the support needs for all authorized sites and also be responsible for the annual Covered Lives count reporting responsibilities.

- E. Covered Lives. As of the Effective Date of this Attachment 22, the State represents and warrants to Optum that the State's total number of Covered Lives is less than **2,300,000**. “Covered Lives” shall mean each subscriber and enrolled dependent eligible for coverage or payment for medical benefits by or through the State. Optum shall be entitled, not more than one time per year, upon reasonable notice and during regular business hours, to audit the State's Covered Lives for the purpose of substantiating the accuracy of reported Covered Lives totals and fee calculations. The State shall be invoiced for any adjustment based upon any difference between its actual Covered Lives and the Covered Lives reported for the fee calculation.

As it relates to Covered Lives above, the State of Michigan is calculating its total Covered Lives as its beneficiaries in the following programs: Traditional Medicaid, Healthy Michigan Plan (HMP), Children's Special Health Care Services (CSHCS), MiChild, Pre-paid Inpatient Health Plan (PIHP), and Maternity Outpatient Medical Services (MOMS).

- F. License Charge. The State agrees to pay Optum the Symmetry License and Support Charge identified in Attachment 4 – Cost Tables for use of the Software for one year from the Effective Date for up to the number of Covered Lives set forth above. The License Charge also covers the Software Support Services during such one year period.

The additional License Charge adjustment amount per year for each 100,000 covered lives above or below 2,300,000 shall be \$6,100.00.

Symmetry Software Support Services

Optum will perform the following Symmetry Software Support Services for the State, which will be deemed to be "Services" under the Agreement, for the current version of the Symmetry Software and one prior version.

- A. Symmetry Software Support Resources. A wide variety of Symmetry Software support resources are available on-line to all of the State's registered users via the Optum and Symmetry websites. Examples of these materials include downloadable product patches, Symmetry Clinical Knowledgebases, Symmetry Suite Product Guides, and Symmetry Software Training Materials including Schedule and Registration instructions.
- B. Help Desk Services. Optum will provide the following help desk support via email and telephone during the Term defined in Section VI of this Attachment 22 in the following areas:
- Assistance with Symmetry Software installation.
 - Assistance with Symmetry Software questions involving general usage, operation, and functionality.
 - Error and bug reporting, analysis, isolation and identification.
 - Information on current releases, Symmetry Software compatibility, restrictions, enhancements, workarounds, and fixes.

Customer Support Helpdesk	
Customer Support Helpdesk	Technical support Services are available to the State by phone and email. The Customer Support Helpdesk supports functional, operational, software, and Symmetry Software-related issues, questions, and outages if applicable. The helpdesk may not be used for training.
Customer Support Helpdesk Availability	8:30 A.M. – 6:00 P.M. Eastern Time, Monday - Friday with the exception of Optum company holidays or office closings.

- C. Generally Available Symmetry Software Updates and Corrections. Optum shall promptly make available to the State all modifications, updates, error corrections, minor releases, major releases and all related documentation for the Symmetry Software that Optum makes available to all of its other licensees of the Symmetry Software. Optum will make minor updates (including error corrections) to the Symmetry Software as Optum determines is appropriate. Migration to new major releases of the Symmetry Software will be coordinated with the the State. The State shall make a good faith effort to migrate to the most current version of the Symmetry Software within a reasonable timeframe from general availability of such current version.

- D. Symmetry Software Verison Support. Optum will support the State in maintenance of the then current release as well as prior releases for a limited time period as indicated per the Release Support Schedule in the Symmetry Software documentation.
- E. Product Incidents. The State agrees to notify Optum promptly following the discovery of any Error. An "Error" shall mean a failure of the Symmetry Software to perform in accordance with the Documentation provided by Optum for that particular Symmetry Software release. Further, upon discovery of an Error, and at the request of Optum, the State agrees to submit a listing of output and any other data that Optum may require in order to reproduce the Error and/or the operating conditions under which the Error occurred or was discovered. The State will provide, as requested by Optum, copies of databases, Error logs, network performance metrics and Symmetry Software parameters to assist Optum in understanding Errors. The State will provide remote access to the State's network and databases, when requested. The State will provide access to database administrators, network administrators, desktop administrators and Symmetry Software administrators, as requested by Optum, to help facilitate rapid resolution of implementation and support issues.
1. Reporting Errors. When the State provides a written report of a potential Error to Optum, Optum will classify such Error as a Severity One Error, Severity Two Error, Severity Three Error, Severity Four Error or as not an Error, and will respond and begin taking actions to correct such Error, as set forth below.
 - (a) Severity One Error (Critical). A "Severity One Error" shall mean an Error occurring (a) after it is first used in production by the State (the "First Commercial Use") that causes the Symmetry Software to fail to install or run and renders the Symmetry Software unusable, or (b) an Error internal to the Symmetry Software that compromises overall Symmetry Software integrity or data integrity when the Symmetry Software is installed or operational (i.e., causing a Symmetry Software crash or loss or corruption of the State's Data. Optum shall make reasonable efforts to respond to calls for a Severity One Error within one (1) business hour.
 - (b) Severity Two Error (High). A "Severity Two Error" shall mean an Error occurring (a) after the State's First Commercial Use in which a required program or feature of the Symmetry Software is unusable, or (b) an Error internal to the Symmetry Software causes a major loss of functionality (i.e., major options or features of the Symmetry Software fail to function) for which there is no known workaround. Optum shall make reasonable efforts to respond to calls for a Severity Two Error within two (2) business hours.
 - (c) Severity Three Error (Medium). A "Severity Three Error" shall mean an Error occurring (i) after the First Commercial Use in which an optional program or feature of the Symmetry Software is unusable, or (ii) an Error internal to the Symmetry Software causes a minor loss of Symmetry Software functionality (i.e., minor options or features of the Symmetry Software fail to function) for which there may or may not be a known workaround. Optum shall make reasonable efforts to respond to calls for a Severity Three Error within eight (8) business hours.
 - (d) Severity Four Error (Low). A "Severity Four Error" shall mean an Error occurring after the First Commercial Use that has only a minor effect on functionality. Optum shall make reasonable efforts to respond to calls for a Severity Four Error within sixteen (16) business hours.
 2. Critical Errors. If an Error is classified as a Severity One Error or a Severity Two Error, Optum will initiate work on developing a resolution such as a fix or workaround consisting of sufficient programming and/or operating instructions ("Error Correction") and will use its commercially reasonable efforts to complete the Error Correction promptly after such Error is reported. Any such Error Correction may be provided through a temporary fix or work-around consisting of sufficient programming and/or operating instructions to implement the

Error Correction. Written reports shall include reports transmitted to Optum by electronic mail delivery; provided that email will only be utilized by the State to convey an Error report as a follow-up to a phone conversation held between the State and Optum for the purpose of orally reporting such Error. Prior to a written or oral report being submitted to Optum, the State will verify and record via the written report that the State has verified the following:

- (a) The Symmetry Software has been installed in complete accordance with the Optum installation instructions and configuration requirements.
 - (b) The State's representative responsible for executing the production is skilled, at a reasonable level, to follow and execute such Optum installation instructions.
 - (c) The State has performed reasonable commercial diligence to ensure that the Error being reported is not due to the presence of or the defect of any third party software or components.
3. Cooperation. If the State does not expend commercially reasonable efforts to comply with the provisions set forth in this Section, then the Error shall be handled in accordance with the criteria for a Severity Four Error.

F. Exceptions. Optum is not responsible for making corrections due to the following reasons:

1. Errors resulting from misuse, improper use, or damage of the Symmetry Software, to the extent caused by the State, provided that the State's actions were not directed by Optum or set forth in the Documentation.
2. Problems caused by any modifications made to the Software, other than modifications made by Optum.
3. Errors resulting from software other than the Symmetry Software supplied by Optum, or from failure of the State's equipment or networks, provided, however, this exception shall not apply to problems arising from or in connection with third-party software, hardware or equipment provided or expressly recommended by Optum for use with the Software.
4. Errors resulting from the combination of the Symmetry Software with any other Symmetry software or equipment to the extent such combination has not been certified by Optum pursuant to this Attachment 22, or otherwise approved by Optum.
5. Errors contained in releases other than as provided for in the Release Support Schedule in the Software documentation.

Collected Data

- A. Definition of Collected Data. "Collected Data" is defined as the State's health care claims and/or health care encounter data in a format containing identifiers from the Software, including but not limited to the ETG number, ETG subclass identifier; the episode number; the cluster number; the episode type; risk markers, and Software version.
- B. Confidentiality of Collected Data. The State agrees not to disclose, permit to be disclosed, or otherwise resell or transfer, with or without consideration, all or any portion of the Collected Data to any third party, except that the State may disclose the Collected Data, at no additional charge to the State, to its consultants or agents for the sole purpose of assisting or advising the State in the conduct of the State's internal business activities. Prior to such disclosure, the State's consultants and agents shall execute a nondisclosure agreement, in a form consistent with the language contained herein, which will prohibit such consultants or agents from using such Collected Data (other than to assist or advise the State), from disclosing such the Collected Data to any third party, and from aggregating the State's Collected Data with data from any other sources. Such nondisclosure agreement must provide that Optum shall be a third party beneficiary of the rights of the State thereunder. If the State is required to disclose the Collected Data by law or by regulatory agencies or other entities with legal authority to examine the Collected Data, the State shall deliver prompt written notice to Optum of such

potential examination, allowing Optum the opportunity to interpose all objections to the proposed disclosure.

Consortium Measures

The EBM Connect software contains measures that are owned by the American Medical Association (“AMA”) and/or the Physician Consortium for Performance Improvement (the “Consortium”).

“Measure” shall mean the consortium measures and documentation posted on the Consortium’s website, which includes the AMA’s copyright notice, including Measure definitions, numerator and denominator statements, inclusions/exclusions, clinical and technical specifications and algorithms necessary to construct each Measure from health care data and to report measure results.

Measures do not include any computer object, application or any type of programming or relational data tables. The State agrees to the terms of the AMA and Consortium Measures End User Agreement in Attachment 23 – Optum Symmetry Software AMA and Consortium Measures End User Agreement.

Attachment 23

Optum Symmetry Software AMA and Consortium Measures End User Agreement

1. Grant of Rights and License Restrictions

- a. The right to use the Measures in the Optum product is non-transferable, non-exclusive, and for the sole purpose of internal use by the State of physician performance measures within the United States and its territories.
- b. For purposes of this end user agreement, physician performance measures shall mean and include only the Consortium measures and related documentation posted on the Web site (www.physicianconsortium.org) ("AMA Web site") that includes the AMA's copyright notice, including measure definitions, numerator and denominator statements, inclusions/exclusions, clinical and technical specifications and algorithms necessary to construct each measure from health care data and to report measure results ("Measures"). Measures as defined and licensed hereunder do not include any computer object, application or any type of programming or relational data tables.
- c. The State shall not modify the Measures except to customize the Measures for use within the State's practice (but in no event will the content of the Measures be altered), removing any copyright, trademark, and attribution notices and disclaimers, creating derivative works (other than to customize the Measures for use within the State's practice), removing copyright, trademark and selling or licensing Measures or otherwise making the Measures or any portion thereof available to any unauthorized party.
- d. Updated versions of the Measures are available at www.physicianconsortium.org, or that Optum will provide updated versions of the Measures in the next release of its Product(s) if commercially feasible.
- e. The State should ensure that anyone who has authorized access to the Product(s) including the Measures complies with the provisions of this agreement and with all applicable laws in the use of the Product(s) and the Measures, including but not limited to the Health Insurance Portability and Accountability Act.

2. Notices

- a. The Measures have been developed by the Consortium and copyrighted by the AMA as the convener and member of the Consortium.
- b. Limited proprietary coding is contained in the Measures data specifications for convenience. This license does not grant any rights to these proprietary code sets. The State agrees to obtain all legally necessary licenses for use of such proprietary coding from the owners of these code sets including a separate license from the AMA for use of Current Procedural Terminology (CPT®). CPT contained in the Measures data specifications is copyrighted by the AMA.

3. Miscellaneous

- a. THE STATE ACKNOWLEDGES THAT MEASURES DEVELOPED BY THE CONSORTIUM ARE INTENDED TO FACILITATE QUALITY IMPROVEMENT ACTIVITIES BY PHYSICIANS. THESE MEASURES ARE NOT CLINICAL GUIDELINES, DO NOT ESTABLISH A STANDARD OF MEDICAL CARE, AND HAVE NOT BEEN TESTED FOR ALL POTENTIAL APPLICATIONS.
- b. THE AMA, THE CONSORTIUM AND ITS MEMBERS SHALL NOT BE RESPONSIBLE FOR ANY USE OF ANY MEASURES. THE MEASURES ARE LICENSED "AS IS" WITHOUT

WARRANTY OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE AMA, THE CONSORTIUM AND THE CONSORTIUM'S MEMBERS DISCLAIM LIABILITY FOR ANY CONSEQUENCES ATTRIBUTABLE TO OR RELATED TO ANY USES, NON-USE OR INTERPRETATION OF INFORMATION CONTAINED IN OR NOT CONTAINED IN THE MEASURES, AND FOR USE OR ACCURACY OF ANY CPT OR OTHER CODING CONTAINED IN MEASURES SPECIFICATIONS. THE DEVELOPMENT AND DISTRIBUTION OF THE MEASURES DOES NOT CONSTITUTE THE PRACTICE OF MEDICINE BY THE AMA, THE CONSORTIUM OR BY ANY OF THE CONSORTIUM'S MEMBERS. IN NO EVENT WILL THE AMA, THE CONSORTIUM OR THE CONSORTIUM'S MEMBERS BE LIABLE TO THE STATE OR TO ANY OTHER PARTY FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH MEASURES EVEN IF THE AMA, THE CONSORTIUM OR THE CONSORTIUM'S MEMBERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

- c. THE AMA, THE CONSORTIUM AND THE CONSORTIUM'S MEMBERS DO NOT WARRANT THAT THE MEASURES WILL MEET THE STATE'S REQUIREMENTS OR THAT THE OPERATION OF THE MEASURES WILL BE UNINTERRUPTED OR WITHOUT ERROR. THE STATE ACKNOWLEDGES THAT THE MEASURES HAVE NOT BEEN DEVELOPED ACCORDING TO THE STATE'S SPECIFICATIONS OR ARE OTHERWISE CUSTOM-MADE. THE AMA, THE CONSORTIUM AND EACH OF ITS MEMBER'S ENTIRE LIABILITY AND THE STATE'S EXCLUSIVE REMEDY SHALL BE FOR THE AMA TO PROVIDE THE STATE WITH COMPLETE COPIES OF MEASURES AS ADOPTED BY THE CONSORTIUM VIA THE AMA'S WEB SITE.
- d. The State acknowledges that Optum may not provide the State with new or updated Measures in the event of the termination or expiration of the agreement between Optum and the AMA (on behalf of the Consortium). The State may continue to use Measures incorporated into its system prior to such termination or expiration of that agreement and obtain updated Measures from the AMA Web site;
- e. In the event a provision is determined to violate any law or is unenforceable, the remainder of this End User agreement shall remain in full force and effect;
- f. The AMA is a third party beneficiary for purposes of enforcing its rights under this End User agreement.

Attachment 24
Optional Protegrity Software, Migration, and Upgrade Services

Qty.	Teradata Part #	Description
Software		
2	H210-3802-0000	Protegrity Database Protector for Teradata 2800 Series - 2 Nodes - Non Prod
2	H210-7021-0000	Protegrity Database Protector for Teradata 6800 Series - 2 nodes - Prod
2	H210-7022-0000	Protegrity Database Protector for Teradata 6800 Series - 2 nodes - Dev/DR
Maintenance/Support		
2	H211-3802-D00G	Gold Support for Protegrity Database Protector for Teradata 2800 Series - 2 Nodes - Non Prod
2	H211-7021-D00G	Gold Support for Protegrity Database Protector for Teradata 6800 Series - 2 nodes - Production
2	H211-7022-D00G	Gold Support for Protegrity Database Protector for Teradata 6800 Series - 2 nodes - Dev/DR
1	Existing	Gold Support for Protegrity Enterprise Security Administrator - 1 Installed Copy - Prod - March 1, 2016- February 28 ,2017
1	Existing	Gold Support for Protegrity Enterprise Security Administrator - 1 Installed Copy - Non-Prod - March 1, 2016- February 28, 2017

Protegrity Software Specifications

PROJECT NAME/ID: Protegrity Migration and Upgrade Services

1. NATURE OF THE PROJECT

This Attachment 24 describes the services that Teradata will provide to migrate the State's Protegrity Defiance Enterprise Security Administrator (ESA) server and Protegrity Defiance Data Protection System (DPS) Data Protector to the New System.

2. PROJECT START AND END DATES

- 2.1. The estimated Start Date for Teradata's performance regarding the Project is: The Start Date will be mutually agreed by the State, Optum, and Teradata.
- 2.2. The estimated End Date for Teradata's performance regarding the Project is: The End Date will be approximately 3-4 weeks after the Start Date.

Optum and Teradata will work with the State on the exact dates and schedule implementation after Optum receives formal approval to proceed.

3. DELIVERABLES

No.	Deliverable
1	Protegrity Migration/Upgrade Completed

Optum will notify the State in writing upon completion of the deliverable.

4. SERVICES

4.1. Protegrity Migration Service

The Protegrity Migration Service includes working with database administrators (DBA), compliance officers, and internal audit from the State as required to perform all or a portion of the following activities:

- Work with the State to decrypt data on the existing Protegrity system
- Install/Configure new Protegrity ESA version
- Drop the UDFs
- Install/Configure new Data Protector version
- Create the new UDFs
- Install/Configure new Security Manager version
- Recreate and redeploy the data elements and policies
- Test representative samples of data/columns for encryption/decryption
- Work with the State to re-encrypt the decrypted data
- Knowledge Transfer Refresh as needed
- Document implementation

4.2. Out Year Protegrity Upgrade Service

The State will want to plan for Protegrity, or any other third party security software, upgrades as part of any Major and/or Minor (15.00 or 15.10 for example) Teradata or Operating System (SLES-10 to SLES-11 for example) upgrade to insure the Protegrity Software version is compatible or will also require upgrading. Upgrade pricing included with this proposal is specific to the System Configuration being offered. If the State upgrades these systems at a future date, then additional Protegrity licenses will also likely need to be purchased since Protegrity is licensed per node and additional installation/upgrade cost will apply for all system expansions or forklift upgrades.

The Protegrity DPS Upgrade Services includes working with the State's database administrators (DBA), compliance officers, and internal audit as required to perform all or a portion of the following activities:

- Work with the State to decrypt data on existing Protegrity system
- Uninstall existing Protegrity ESA server and data protectors from the State's Teradata system
- Install current version of Protegrity ESA server on the State's Teradata production platform
- Install Data Protectors for Teradata on the State's Teradata production platform
- Installation of Protegrity UDFs on the States Teradata database
- Reimport User names into new ESA Server
- Recreate existing Data Elements in ESA Server
- Redeploy existing Policies in ESA Server
- Work with the State to re-encrypt decrypted columns

5. DEPENDENCIES & CLIENT RESPONSIBILITIES/ PERSONNEL

5.1. Optum's and Teradata's agreement to this Attachment 24 and its duty to perform in accordance with this Attachment 24 are dependent and conditioned upon the following dependencies being satisfied, upon the State being responsible for and completing the following engagement-specific responsibilities, and upon the State providing the following personnel resources:

5.2. Dependencies and responsibilities of the State consist of:

- Providing access to building (contact information, badges, etc).

- Providing meeting rooms for interactive sessions for an anticipated 1 to 6 hours of meetings each day.
- Providing work space for Teradata Consultant(s) during project.
- Providing access to the State's network and Teradata systems either through a Client provided workstation or LAN connectivity for the Teradata consultant's laptop.
- Providing all required system admin, DBC, root or other login passwords as required to complete the software installation and configuration work described.
- Providing Teradata Consultant(s) the ability to print documents.
- Providing dedicated low end servers for installation of the Defiance DPS ESA server software including: Hub Controller, Audit Reporting engine and Security Administrator software. Minimum specifications for this host will be provided by Teradata in advance.
- Defining and providing internal information security policy compliance requirements.
- Working with Teradata InfoSec COE Consultants to interpret and understand regulatory compliance requirements for the data contents of the Teradata systems.
- Providing sufficient resources from the Teradata DBA/SA group to assist with configuration changes to the Teradata environment.
- Providing sufficient resources from the Information Security and/Compliance group to assist with configuration changes to the Defiance DPS environment and to take advantage of knowledge transfer opportunities during the engagement.
- Providing EDW and Information Security team personnel to arrange required change control processing and approvals in a timely manner.
- Providing EDW and Information Security personnel to work alongside Teradata InfoSec COE Consultants for knowledge transfer. This will not be a substitute for formal training in Protegrity Defiance DPS design, implementation and operations.
- Providing required policy documentation pertaining to the project prior to the beginning of the on-site work and other requested documentation within a reasonable time.
- All identified State resources will be available and will participate in the project as determined and required by the project schedule.

5.3. Client Personnel required for the Project include:

The following table lists the roles and summarizes the tasks and skills required to deliver the requested services described in this Exhibit 2.

Role	Description of Tasks	Skill Set
Senior Information Security Architect	Work with Teradata personnel to define policies, roles, user provisioning and audit reporting processes and requirements.	Knowledgeable in the State information security policies and processes and relevant regulatory requirements such a PCI-DSS and data privacy in general.
Information Architect / DBA / Information Custodian/or equivalent	Work with Teradata personnel to provide knowledge of existing data model and EDW architecture.	Knowledgeable about State's EDW architecture, data model and operational procedures including relevant ETL processes. Knowledgeable on data business rules and policies.
User Account Administrator	Work with Teradata personnel to learn how to add/remove user and group access rights to encrypted data.	Knowledgeable in the State policies and processes regarding user provisioning, Role Based Access Controls (RBAC) and organizational roles within the State.
Internal Audit representative	Work with Teradata personnel to provide understanding and clarification of audit reporting requirements. Work with Teradata personnel for knowledge transfer	Knowledgeable about the State audit reporting requirements for access to encrypted data with the Teradata EDW.

Role	Description of Tasks	Skill Set
	for audit report administration.	
Network Administrator	Work with Teradata personnel to make required network configuration changes.	Familiar with networking component administration and configuration including firewalls, routers and switches.

5.4. Dependencies and responsibilities of the State consist of:

- Granting Teradata access to the Teradata DBC, and the UNIX Root or Windows Administrator.
- Providing a work area for Teradata personnel which includes a cube/desk, a telephone, a laptop connection to your network (or a workstation with a network connection), and a modem line.

5.5. State Personnel required for the Project include:

Project Manager

A project leader who is available to meet regularly with Teradata personnel on matters pertaining to this project, able to procure and direct company resources as requested by the Teradata Consultants.

Information Systems Representative

A manager who is familiar with the administration and workings of the State of Michigan's Information Systems group, and who is versed in the operation and management of the Teradata systems.

6. OUT OF SCOPE SERVICES; EXCLUSIONS

6.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 24 once approved by both parties. Services that are outside the scope of this Attachment 24 include, but are not limited to, the following:

- Reengineering of processes
- The solution of any problem originating from the quality of the data
- The design or development of applications to create non-existent data or to modify current data
- The construction of a dictionary of current data used to populate one or more databases
- Training of other people that are not Client Project Team members
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer
- Complex analytical processing that is not included as part of a Teradata-provided solution's functionality
- Security hardening of any other servers not specifically identified

Attachment 25

Protegrity Gold Support Description

If the State orders and has a Protegrity Gold Support Plan in effect, the State shall have access to Protegrity's Support Team, twenty four (24) hours per day (24/7/365).

All Maintenance and Support service will be made available for the State by Protegrity solely via email, telephone or at licensor's website as follows: email: support@protegrity.com, phone number: (203) 326-7200 (Support Services: #2), live chat on Licensor's website: www.protegrity.com and Licensor's Solution Center: www.protegrity.com/products-services/customer-support/.

Error Severity Categories and Initial Response Time Targets

Severity Category	Initial Response Time	Solution
Description	(Gold Plan)	
S1 – production system(s) down	One (1) hour	Emergency error fix, if required. Bug Fix included in next release.
S2 – operation of a production system is severely disrupted	Two (2) hours	Workaround and emergency error fix, if required. Bug Fix included in the next release.
S3 –software does not operate as designed, moderate impact	Four (4) business hours	Bug Fix included in next release.
S4 – minor problem or request for enhancement	Within one (1) business day	Bug Fix to be planned in a future release.

“Error Severity Categories” mean:

“Severity 1” or **“S1”** means an incident, which renders the State's production system at a halt and unable to process data involving use of Maintained Software;

“Severity 2” or **“S2”** means an incident, which causes serious disruption of a major business function involving use of Maintained Software, but can be temporarily solved by a Workaround;

“Severity 3” or **“S3”** means an incident, which causes Maintained Software not to operate as designed, but having only a moderate impact on the State's use of Maintained Software; and

“Severity 4” or **“S4”** means an incident, which indicates only a minor problem or represents a request for enhancement.

Attachment 26
Optional Hadoop Infrastructure Specifications

Qty.	Teradata Part #	Description
Hardware		
1	9231-2100-8090	Base Cabinet – Hadoop
1	9231-F051	30A 3 Phase Delta, Four Cords, Bottom egress, North America
1	9231-F063	System VMS
1	9231-F073	KMM
2	9231-F146	Hadoop Appliance 4 - Hadoop Master node – includes: <ul style="list-style-type: none"> - Dell R720 2U Node Chassis with two Intel XEON® 2.5GHz Ten-core E5-2670v2 Processors with 20MB L3 Cache. - 256 GB memory using 16GB DIMMs (1600MHz DDR 3) - Two 900 GB SAS 2.5" 10K rpm Disk Drives for Operating System, RAID 1 - Six 900 GB 2.5" 10K rpm Disk Drives for Data Storage, RAID 10 - PERC H710 RAID Controller - 2 (on board) 10/100/1000 Ethernet for Server Management - 2 (on board) 10/100/1000 Ethernet for Customer use - Adapter ports for InfiniBand Adapter - Adapter ports for Ethernet Adapter
10	9231-F147	Hadoop Appliance 4 - Hadoop Data node – each node includes: <ul style="list-style-type: none"> - Dell R720XD 2U Node Chassis with two Intel XEON® 2.1GHz Six-core E5-2620v2 Processors with 15MB L3 Cache. - 128 GB memory using 16GB DIMMs (1600MHz DDR 3) - Two 900 GB SAS 2.5" 10K rpm Disk Drives for Operating System, RAID 1 - Twelve 4 TB 3.5" 7.2K rpm Disk Drives for Data Storage, configured with No RAID - PERC H710P RAID Controller - 2 (on board) 10/100/1000 Ethernet for Server Management - 2 (on board) 10/100/1000 Ethernet for Customer use - Adapter ports for InfiniBand Adapter - Adapter ports for Ethernet Adapter - Additional Data Node for Hadoop may be ordered. There is no maximum number per Cluster for more storage. - Customer Usable Disk space is 12.6 TB uncompressed and 37.8 TB compressed – actual storage may vary significantly by data type. Use 12.6TB for space calculations.
1	9231-F148	Hadoop Appliance 4 - Hadoop Edge node – includes: <ul style="list-style-type: none"> - Dell R720 2U Node Chassis with two Intel XEON® 2.5GHz Ten-core E5-2670v2 Processors with 20MB L3 Cache. - 256 GB memory using 16GB DIMMs (1600MHz DDR 3) - Two 900 GB SAS 2.5" 10K rpm Disk Drives for Operating System, RAID 1 - Six 900 GB 2.5" 10K rpm Disk Drives for Data Storage, RAID 10 - PERC H710 RAID Controller - 2 (on board) 10/100/1000 Ethernet for Server Management - 2 (on board) 10/100/1000 Ethernet for Customer use - Adapter ports for InfiniBand Adapter - Adapter ports for Ethernet Adapter
39	9231-F250	Adapter, PCIe 10Gb Ethernet, 2 Channel, Fiber, LP
13	9231-F252	Adapter, PCIe, 56Gb/s InfiniBand, 2 Channel, LP
1	9231-F794	Aster/Hadoop Switch, 36 Port, InfiniBand (2 switches, no cables)
1	9231-F884	9231 Base Cabinet Install Feature
13	9231-F885	1-Node Install Feature

Qty.	Teradata Part #	Description
26	9231-F939	QSFP+ Copper Cable Assembly, 2.0 meter
4	9231-F941	Front Filler Panel, 2U
13	9231-F985	UDA - STAGING & INTEGRATION (per node)
1	9231-F997	TMS, Staging & Integration (Reference Feature)
1	9231-K072	Rack 42U, Side Panel
2	9231-K170	Hard Drive, 900GB 10K RPM (Dell Only)
2	9231-K172	HDD,4TB,3.5" FDE, 7.2K rp, Dell, SAS
1	9231-K936	9231 System Kit
13	9231-F009	Teradata Encryption Feature
1	9231-F010	Teradata Aster / Hadoop Appliance 3 & 4 Data Encryption for TMS
Software		
1	2021-K944	Drive, External USB, DVD-ROM
1	F444-6720-0000	VMS Server Management Software
15	F601-8247-0000	SuSE Linux SLES License, per node
1	F601-8248-0000	SUSE Linux SLES License for CMIC
1	F601-8280-0000	Linux SLES 10/11 SP3 BCD0-1553; SW Media Kit 892000328001
1	F601-8290-0000	Linux SLES 11 SP1 BCD0-1388 for CMIC: SW Media Kit 892000328001
1	F601-8295-0000	Linux SLES 11 SP1 BCD0-1842: SW Media Kit 892000328001
1	F601-9555-0000	Sun Java Windows (Embedded)
13	F010-0021-0000	Teradata Open Distribution for Hadoop BASE v2.1 (Annual)
13	F020-2000-T000	Loom for TDH per node - 1 Year Term License
13	F022-2000-2000	Teradata Loom 2.4.0 for TDH per node - Term License Fulfillment
1	F801-5551-0000	Teradata Viewpoint Appliance Portal, Self Serv & Mgmt Portlets 15.00
13	F020-2000-T000	Loom for TDH per node - 1 Year Term License Subscription
15	F601-8247-A000	SuSE Linux SLES License, per node Subscription
354	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
1	F853-Q002-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - 2-Node Appliance - per each 2 nodes (<=12 Nodes/System) – Test System
1	F987-Q002-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH -2-node Appliance - per each 2 nodes (<=12 Nodes/System) – Test System
Year 2 Subscription and COD		
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
47	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
47	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System

Qty.	Teradata Part #	Description
17	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
17	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
Year 3 Subscription and COD		
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
48	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
95	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
30	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
47	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
Year 4 Subscription and COD		
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
53	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
148	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
42	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
89	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
Year 5 Subscription and COD		
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
66	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
214	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
42	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR system
131	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
Year 6 Subscription and COD		
354	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
30	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System

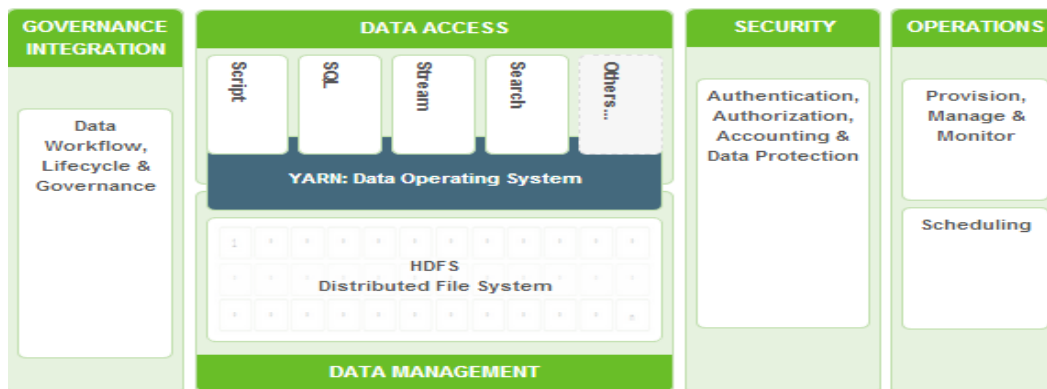
Qty.	Teradata Part #	Description
244	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Production System
252	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
48	F853-Q000-0000	Teradata QueryGrid: TD 15.00 DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System
179	F987-Q000-A000	Teradata Subscription: QueryGrid: TD DB - to - TDH - MPP - per TPerf (<=1500 TPerf/System) – Dev/DR System

Attachment 27 Optional Hadoop Mentoring Services

PROJECT NAME/ID: Mentoring Services for Hadoop Appliance

1. NATURE OF THE PROJECT

This Teradata Professional Services offer will assist the State with a standing Teradata Data Platform (Hadoop Appliance) infrastructure and basic capabilities focused around a single data source that will fit within the engagement timeframe. This engagement assumes the hardware has already been purchased and is on the floor at the customer site.



2. PROJECT START AND END DATES

This engagement runs over 3 contiguous weeks.

		Week 1	Week 2	Week 3
Activity (per COE member)				
Requirements Gathering and Planning				
Design data source provisioning/Standup Plan				
Perform basic tests/turnover/Review				

- 2.1. The estimated Start Date for Teradata's performance regarding the Project is: The Start Date will be mutually agreed by Optum, State of Michigan, and Teradata but where the current estimate is immediately upon successful completion of the factory installation routines of the New Production System and applicable servers at the State's site.
- 2.2. The estimated End Date for Teradata's performance regarding the Project is: The End Date will be mutually agreed upon by Optum, State of Michigan and Teradata but where the current estimate is forty-five (45) days after successful completion of the factory installation routines of the New Production System, applicable servers at the State's site.

3. SERVICES

3.1. Engagement Professional Services

Requirements Gathering and Planning

- Obtain Requirements
- Determine use case
- Refine use case scenario to a single data source that will fit within 3 weeks

- Create deployment plan

Design Data Source Provisioning/Standup Plan

- Verify data connectivity as appropriate for Data Platform (Hadoop)
- Verify State connectivity to Hadoop
- Implement Standup via connectivity and basic data source provisioning
- Review administration functions
- Review mechanisms for operation and basic testing

Perform Basic Tests/Turnover

- Perform basic test as prescribed for <the use case> where appropriate
- Review test output
- Deliver turnover documents/artifacts
- Deliver documents/artifacts

Note: capabilities are shown are dependent on Hadoop distribution and/or enabling technology version.

3.2. Resources (assuming all services selected)

Teradata will provide two (2) UDA consultants to execute this engagement.

3.2.1. UDA Architecture COE consultant (100%)

- Planning/training, Testing, mentoring on enablement technology administration

3.2.2. UDA Architecture COE staff consultant (100%)

- Planning, Developing, Development execution of standup plan

3.3. State Dependencies

Teradata and the State teams will work together to execute the mentoring engagement.

Note: the “%” is the estimated amount of time required by State resource

Project Manager (25%)

- Co-ordinate resources (Customer and Teradata)
- Meeting planning – notes distribution
- Responsible for timely review and validation of artifacts
- Responsible for assisting to build integration delivery task list
- Status reporting

State Technologist/Engineer (100%)

- Participate in project delivery – validate /review artifacts
- Providing Infrastructure and architecture topology and component integration

Application/Subject area SMEs

- Depending on area of focus and tools

Technical Dependencies

- Existing Teradata Data Platform (i.e. Teradata Hadoop Appliance)
- Existing Enabling Technology for the data source (i.e. jdbc, etc.)
- Known Use Case
- Pre-defined data set loaded onto Teradata Data Platform
- Operations: Development Environment Only
- Operations: Users defined/established

4. OUT OF SCOPE SERVICES; EXCLUSIONS

4.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 27 once approved by both parties. Services that are outside the scope of this Attachment 27 include, but are not limited to, the following:

- Reengineering of processes
- The solution of any problem originating from the quality of the data
- The design or development of applications to create non-existent data or to modify current data
- The construction of a dictionary of current data used to populate one or more databases
- Training of other people that are not State Project Team members
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer
- Complex analytical processing that is not included as part of a Teradata-provided solution's functionality
- Security hardening of any other servers not specifically identified in Section 4

Attachment 28

Optional Hadoop Hardening Services

PROJECT NAME/ID: IRS SCSEM OS System Hardening Services for Hadoop Appliance

1. NATURE OF THE PROJECT

Teradata will perform the initial IRS SCSEM Operating System Hardening Services for the proposed Hadoop Appliance with 2 Master Nodes, 10 Data Nodes and 1 Edge Node.

2. PROJECT START AND END DATES

- 2.1. The estimated Start Date for Teradata's performance regarding the Project is: The Start Date will be mutually agreed by Optum, the State, and Teradata but where the current estimate is immediately upon successful completion of the factory installation routines of the Hadoop Systems and applicable servers at the State's site.
- 2.2. The estimated End Date for Teradata's performance regarding the Project is: The End Date will be mutually agreed upon by Optum, the State, and Teradata but where the current estimate is forty-five (45) days after successful completion of the factory installation routines of the Hadoop System, applicable servers at the State's site.

5. SERVICES

5.1. Initial Operating System (OS) Level IRS SCSEM Security Hardening Service

Teradata will harden the Hadoop Systems in accordance with the most current IRS SCSEM through configuration changes where possible. Any code and/or software changes required in order to meet the security requirements are not covered under this SOW. When operational changes are required in order to meet the security requirements, Teradata will identify them and provide the information to the State's resources for implementation. Operational changes may include password policy changes on all platforms, keeping up the platform baseline, having a process to secure the environment where the platforms are located, etc. Configuration changes to meet the IRS SCSEM security requirements will be documented and provided to the State at the completion of the System Hardening Services for the Hadoop environment.

The following is a list of tasks to be performed by the Teradata Security Specialist as proposed.

- Review OS system configuration settings, vulnerability scan results if provided and OS level information security issues with Customer. Vulnerability scan must be run prior to system hardening being started. Teradata will review one subsequent scan following the system hardening.
- Disabling unnecessary services and protocols
- Limiting access rights to critical system files and services to only what is required
- Provide completed IRS SCSEM
- Create a baseline for returning system to the same state after software upgrades for comparing current state over time to established baseline configuration
- Implementation and testing of custom or unique OS level security configurations

5.2. The scope of work for the OS level system hardening services is limited to the following platforms and based on the following assumptions;

- Hadoop Appliance with 2 Master Nodes, 10 Data Nodes and 1 Edge Node (13 Servers)

5.3. Assumptions:

- Hardening will be done in accordance with the most current IRS SCSEM requirements
- No other application servers not specifically mentioned above are included for the System Hardening Services identified below.
- Integration with the Customers Single Login is not included in the System Hardening Services.
- Integration and testing with external Directory Services or Active Directory for user Authentication or Authorization are not included in the System Hardening Services.
- Teradata provides SSL equivalent network traffic encryption between client and server or server to server (BI tool, ETL, BAR, etc.) but does not use the SSL (which was primarily designed for web browser/web server network traffic encryption).
- Integration and testing for User Authentication using RSA Secured tokens is not included in the System Hardening Services.

5.4. (Optional) Out Year Service for Operating System (OS) Level Security Hardening Audit Service

Teradata recommends that regular OS Level Security Hardening Audits be performed to ensure that the Initial OS Level Security Hardening configurations are maintained. Changes to the Hardening configuration can occur during installation of OS patches and/or upgrades, so many of our Customers coordinate the Audit Service with their Teradata Maintenance upgrades.

The following is a list of tasks to be performed for the OS Level Security Hardening Audit Service:

- Teradata will review the report of the State's designated vulnerability scan performed on the Teradata System Linux nodes.
- Teradata will recommend which of the items identified by the designated vulnerability scan require remediation
- Teradata may identify certain vulnerability scan report findings as false positives not requiring remediation by further operating system hardening procedures. Accordingly, the time specified for performance of this quarterly review service is based on the State's agreement with the Teradata recommendation of the items to be remediated by operating system hardening procedures. If Client nonetheless requires that the Teradata remediate the identified false positives, then the will estimate the time necessary to perform such additional work and an appropriate Change Order must be executed by State authorizing the additional work.

The scope of work for the OS level system hardening audit service is limited to the following platforms:

- Hadoop Appliance with 2 Master Nodes, 10 Data Nodes and 1 Edge Node (13 Servers)

6. DELIVERABLES

6.1. Teradata will provide the following Deliverables:

Deliverable Number	Deliverable
1	IRS SCSEM for Production Environment
2	IRS SCSEM for Test Environment
3	IRS SCSEM for Development Environment

7. DEPENDENCIES AND STATE RESPONSIBILITIES/ PERSONNEL

7.1. Optum's and Teradata's agreement to this Attachment 28 and its duty to perform in accordance with this are dependent and conditioned upon the following dependencies being satisfied, upon the State being responsible for and completing the following engagement-specific responsibilities, and upon the State providing the following personnel resources:

7.2. Dependencies and responsibilities of the State consist of:

- Granting Teradata access to the Teradata DBC, and the UNIX Root or Windows Administrator.
- Providing a work area for Teradata personnel which includes a cube/desk, a telephone, a laptop connection to your network (or a workstation with a network connection), and a modem line.

7.3. State Personnel required for the Project include:

Project Manager

A project leader who is available to meet regularly with Teradata personnel on matters pertaining to this project, able to procure and direct company resources as requested by the Teradata Consultants.

Information Systems Representative

A manager who is familiar with the administration and workings of the State's Information Systems group, and who is versed in the operation and management of the Teradata systems.

8. OUT OF SCOPE SERVICES; EXCLUSIONS

8.1. The Services to be provided by Teradata include only what is expressly described in this Attachment 28 once approved by both parties. Services that are outside the scope of this Attachment 28 include, but are not limited to, the following:

- Reengineering of processes
- The solution of any problem originating from the quality of the data
- The design or development of applications to create non-existent data or to modify current data
- The construction of a dictionary of current data used to populate one or more databases
- Training of other people that are not Client Project Team members
- Full-production operationalization (such as complete automation and error handling for the data loads) optimization, performance tuning, data and operations management, archive/recovery, and knowledge transfer
- Complex analytical processing that is not included as part of a Teradata-provided solution's functionality
- Security hardening of any other servers not specifically identified in Section 4

Attachment 29

Optional Unity Server Infrastructure Specifications

Qty.	Teradata Part #	Description
Hardware		
2	9212-F714	TMS (E14S), Unity Source Link/Query Grid, Model 679-V5-10C
2	9212-F997	TMS, Staging & Integration, (Reference Feature)
1	9212-F714	TMS (E14S), Unity Source Link, Model 679-V5-10C
1	9212-F997	TMS, Staging & Integration, (Reference Feature)
Software		
354	F853-Q0S0-0000	Teradata QueryGrid: TD 15.00 DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
1	F853-Q0S2-0000	Teradata QueryGrid: TD 15.00 DB - to - Oracle (same as USL) - 2-Node Appliance, per each 2 nodes (<=12 nodes/System)
252	F853-Q0S0-0000	Teradata QueryGrid: TD 15.00 DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
1	9212-F714	TMS (E14S), Unity Source Link, Model 679-V5-10C
1	9212-F997	TMS, Staging & Integration, (Reference Feature)
354	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
1	F987-Q0S2-A000	Teradata Subscription: QueryGrid: TD DB-to-Oracle (same as USL) - 2-Node Appliance, per each 2 nodes (<=12 nodes/System)
252	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
Year 2 COD		
47	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
17	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
Year 3 COD		
95	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
47	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
Year 4 COD		
148	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
89	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
Year 5 COD		
214	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
131	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
Year 6 COD		
244	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)
179	F987-Q0S0-A000	Teradata Subscription: QueryGrid: TD DB - to - Oracle (same as USL) - MPP, per TPerf (<=1500 TPerf/System)

Attachment 30

Production and Dev/DR Sizing Specifications and COD Increments

Current Production System	Tperf	CurrentPerm (GB) As-of 2015-03-09
3&2 5650 @ 87.5% PM COD =	313	25517

Contract Year	Start Date	End Date	Compound Annual Tperf Growth Target at 12.5%	Tperf COD In-A-Perfect World for 2+1 N-6800 299 Tperf/Node Maximum	Tperf COD Target % with Minimum 128 Tperf/Node	Resulting Tperf with Minimum 128 Tperf/Node	Tperf Year over Year Increase Amount	Compound Annual Growth Target at 12.5% (..GB..)	Minimum CurrentPerm Threshold Previous Column Plus 10% for Minimum CurrentPerm Threshold (..GB..)	Estimated HDD COD Percentage	HDD Year over Year Increase Amount	Estimated CurrentPerm Threshold (..GB..)	Estimated CurrentPerm Threshold to Spare (..GB..)
1	4/1/2016	3/31/2017	353	59.0%	59.0%	354	41	28,707	31,577	50%	0%	35,727	29,773
2	4/1/2017	3/31/2018	397	66.4%	67.0%	401	47	32,295	35,524	50%	0%	35,727	29,773
3	4/1/2018	3/31/2019	447	74.7%	75.0%	449	48	36,332	39,965	62%	12%	39,976	33,314
4	4/1/2019	3/31/2020	503	84.1%	84.0%	502	53	40,873	44,961	77%	15%	45,287	37,799
5	4/1/2020	3/31/2021	566	94.6%	95.0%	568	66	45,982	50,581	92%	15%	50,599	42,166
6	4/1/2021	3/31/2022	637	106.5%	100.0%	598	30	51,730	56,903	100%	8%	53,432	44,527

Current Dev/DR System	Tperf	CurrentPerm (GB) As-of 2015-03-09
2&1 5650 @ 100% PM COD =	238	25517

Contract Year	Start Date	End Date	Target Tperf at 2/3 Prod	Tperf COD In-A-Perfect World for 2+1 N-6800 299 Tperf/Node Maximum	Tperf COD Target % with Minimum 128 Tperf/Node	Resulting Tperf with Minimum 128 Tperf/Node	Tperf Year over Year Increase Amount	Compound Annual Growth Target at 12.5% (..GB..)	Minimum CurrentPerm Threshold Previous Column Plus 10% for Minimum CurrentPerm Threshold (..GB..)	Estimated HDD COD Percentage	HDD Year over Year Increase Amount	Estimated CurrentPerm Threshold (..GB..)	Estimated CurrentPerm Threshold to Spare (..GB..)
1	4/1/2016	3/31/2017	237	39.6%	42.0%	252	14	19,233	21,157	50%	0%	33,918	27,665
2	4/1/2017	3/31/2018	266	44.5%	45.0%	269	17	21,638	23,801	50%	0%	33,918	27,665
3	4/1/2018	3/31/2019	299	50.0%	50.0%	299	30	24,342	26,777	50%	0%	33,918	27,665
4	4/1/2019	3/31/2020	337	56.4%	57.0%	341	42	27,385	30,124	50%	0%	33,918	27,665
5	4/1/2020	3/31/2021	379	63.4%	64.0%	383	42	30,808	33,889	53%	3%	34,108	28,424
6	4/1/2021	3/31/2022	427	71.4%	72.0%	431	48	34,659	38,125	67%	14%	38,358	31,965

Attachment 31

TDWI Training Services

TDWI Training Services: The State has requested that Optum continue to make TDWI (The Data Warehouse Institute) training courses available to the State via the Contract through the extended term of the contract. Optum intends to provide the TDWI Training Services via our subcontractor 1105 Media, Inc. dba The Data Warehousing Institute ("TDWI") and TDWI will provide the Services to the State.

A total of 10 days of TDWI training for a group of 1-12 attendees have been included in Attachment 4 – Cost Tables. Neither the signing of this Change Request 020 nor the Contract guarantees any minimum volume of TDWI Training Services to be provided by Optum. Instead, as more fully set forth below, the extent of any obligations for State to use Optum's TDWI Training Services shall be defined by the issuance of a TDWI Training Work Order(s) and associated purchase order(s) by the State to Optum for the TDWI Training Services as described further below.

TDWI Training Services Description

The specific courses that are available to be selected by the State for the TDWI Training Services can be found at any time on the TDWI.org website via the TDWI Onsite Education Catalogue.

Upon Optum's receipt of a request from the State for TDWI Training Services, Optum shall formalize such request in a TDWI Training Services Work Order ("Work Order") which will be signed by both Optum and the State. The details of the requested TDWI Training Services will be described in each Work Order and when executed between the parties hereto becomes an amendment to this Change Request Proposal 020. Each Work Order will define the course content, schedule, total price for the TDWI Training Services based on the daily pricing set forth below and other parameters. Upon execution of the Work Order(s), the State will issue a corresponding Purchase Order to Optum for the TDWI Training Services requested.

Course Description/Curriculum. TDWI shall be responsible for the selection of all course instructors subject to the State's right to make non-binding requests for instructors, and provided, further that TDWI shall retain full control over the planning of the content of the course. The State acknowledges that instructors are TDWI-approved and certified to teach the course, but are not necessarily employees of TDWI.

Changes in Course Description /Curriculum, requested by the State and set forth within the Work Order(s), which would affect the time schedule and/or estimated charges will be documented and submitted for Optum and TDWI's approval prior to performing the TDWI Training Services. Optum shall notify the State of the feasibility and all costs associated with any such change in Course or Curriculum. All costs associated with such changes shall be the responsibility of the State. Notwithstanding the right to request changes, the State may be liable for cancellation charges consistent with the cancellation provisions noted below.

Ownership. The State acknowledges that TDWI or its affiliated third party owns all right, title and interest, including, without limitation, the copyright, in and to all course materials, course instructions and presentations and all components thereof in all formats including but not limited to print, CD_ROM, audio, video and/or digital reproduction ("Course Materials"). The copyright and title to all property interests in or to the Course Materials shall remain in TDWI as owner and this Change Request Proposal 015 shall not grant to the State any right to ownership therein.

Limitations on Usage. The State shall not copy, download, video tape or otherwise reproduce the

Course Materials in any medium or in any way, in whole or in part, without the express written consent of Optum and TDWI. Any such permitted reproductions shall remain the sole and exclusive property of TDWI for use solely as permitted by the terms of this Change Request Proposal 020 or the applicable Work Order(s). In addition, the State shall not alter, modify or adapt the Course Materials including but not limited to downloading, decompiling, disassembling, or creating derivative works; or sell, license or otherwise distribute the Course Materials to third parties, without the express written consent of TDWI.

Promotion or Use of TDWI Logo and Materials. The State hereby agrees that it cannot use any TDWI Logos, course titles, course descriptions or materials for any promotional activity without the pre-approved written consent of TDWI. All text used for external promotion of TDWI Training Services must be reviewed and approved in advance. Information posted on the State's website regarding TDWI Training Services must be reviewed and approved by TDWI prior to appearing on the State's website.

Relationship with TDWI Faculty. The State and its affiliate organizations may not work directly with any TDWI faculty member to arrange training whether it be onsite or publicly offered, including independent promotion of faculty owned training and workshops. All requests for training and workshops must come through Optum and TDWI.

Cancellation. The TDWI Training Services being scheduled by TDWI hereunder may be terminated by the State for any reason upon written notification to Optum. In the event of termination by the State, the State shall be responsible for any non-refundable payments and expenses (i.e. instructor airfare, shipping costs, etc.) incurred by TDWI or the assigned TDWI instructor at the time of cancellation. If cancellation occurs less than 14 days prior to the scheduled training, in addition to non-refundable payments and expenses, a 20% cancellation fee will apply.

Rescheduling. The course/teaching being scheduled by TDWI hereunder may be rescheduled by the State for any reason upon written notification to Optum. TDWI will use reasonable efforts to accommodate the State's request to reschedule the course; provided, however that the State shall be responsible for any costs associated with the rescheduling of the course and any expenses previously incurred.

Representations and Warranties. TDWI represents and warrants that (i) any Course Materials provided by TDWI to the State shall be TDWI's original work product or work product which TDWI has authority to use in connection with the Course Materials and shall not infringe any copyright or other proprietary rights of any third party; and (ii) all work hereunder will be performed in a professional manner by qualified personnel consistent with good professional practices applicable to the work being performed.

Additional Details

- Courses that can be ordered as part of the TDWI Training Services can be found on the TDWI.org website under Onsite Education and "Onsite Course List".
- Instructor Led TDWI Training Services will be delivered onsite at the State's location
- The State is responsible for obtaining training facilities
- TDWI Training Services do not require laptops or desktops
- A learning needs assessment will be performed prior to the delivery of TDWI Training Services
- Pre-course discussion with the TDWI-certified instructor will be held so that course content is aligned with the State's training objectives
- Printing and shipping of all course materials and shipping of all instructor supplies is included in the daily rate.
- Ordering the TDWI Training Services

- The State will notify Optum when TDWI Training Services are being requested and Optum will subsequently notify TDWI.
 - Optum and TDWI will work with the State to arrange for a mutually acceptable delivery date(s) for the TDWI Training Services that will be based upon:
 - Availability of TDWI Instructors
 - Availability of the State staff receiving the TDWI Training Services
 - Availability of the State training facilities
 - The State will sign a Work Order when the details of the TDWI Training Services have been mutually agreed upon by the parties
 - The State will subsequently issue a Purchase Order to Optum for the TDWI Training Services based on the Work Order.
 - Optum will in turn issue a Purchase Order to TDWI.
- Accepting the TDWI Training Services: The State shall sign a Delivery Acceptance Letter provided by Optum to the Customer upon completion of the Training Services to evidence the Customer's acceptance of such TDWI Training Services.

2.2 Location of the TDWI Training Services

The TDWI Training Services will be performed, completed, and managed in the Lansing, Michigan area, either at the State's site or Optum's facility in Lansing, Michigan. Notwithstanding the foregoing, TDWI may perform the TDWI Training Services at a different location than that described in the previous sentence based upon the mutual agreement of the State, Optum, and TDWI.

Attachment 32

Draft Project Schedule for Implementation

ID	Task Name	Duration	Start	Finish
1	MICHIGAN ENTERPRISE DATA WAREHOUSE UPGRADE	116 d	Mon 11/2/15	Fri 4/22/16
2	PROJECT START DATE	0.6 d	Mon 11/2/15	Mon 11/2/15
4	PROJECT INITIATION AND START-UP	10.5 d	Mon 11/2/15	Tue 11/17/15
5	TRAINING	1 d	Mon 11/2/15	Tue 11/3/15
8	PROJECT PLAN DEVELOPMENT	10.5 d	Mon 11/2/15	Tue 11/17/15
14	STATE ADMINISTRATION	2 d	Mon 11/2/15	Tue 11/3/15
17	PLATFORM UPGRADE ACTIVITIES	115.65 d	Mon 11/2/15	Fri 4/22/16
18	DEVELOPMENT SYSTEM (DRBC)	111.35 d	Mon 11/2/15	Mon 4/18/16
19	DEVELOPMENT SYSTEM INSTALLATION	46.15 d	Mon 11/2/15	Thu 1/14/16
20	FACILITY PREPARATION AND DEVELOPMENT SYSTEM INSTALL	46.15 d	Mon 11/2/15	Thu 1/14/16
21	SITE PLANNING - DEVELOPMENT SYSTEM	19.5 d	Mon 11/2/15	Wed 12/2/15
30	PREPARE COMPUTER ROOM SPACE - DEVELOPMENT SYSTEM	6 d	Thu 12/3/15	Wed 12/9/15
36	HARDWARE AND OS PREP - DEVELOPMENT SYSTEM	28.65 d	Tue 12/1/15	Thu 1/14/16
46	VERIFY SYSTEM OPERATIONAL - DEVELOPMENT SYSTEM	0.6 d	Thu 12/17/15	Fri 12/18/15
50	ESTABLISH AND TEST BAR PROCESS - DEVELOPMENT SYSTEM	10 d	Fri 12/18/15	Thu 1/7/16
54	PRE-NPARC TESTING - DEVELOPMENT SYSTEM	1.7 d	Fri 12/18/15	Mon 12/21/15
59	TESTING AND MIGRATION - DEVELOPMENT SYSTEM	84.36 d	Mon 11/2/15	Thu 3/24/16
60	CREATE TEST PLANS - DEVELOPMENT SYSTEM	14.6 d	Mon 11/2/15	Mon 11/23/15
65	INITIAL DATA MIGRATION (NPARC#1) - DEVELOPMENT SYSTEM	32.36 d	Wed 11/4/15	Wed 12/2/15
69	COMPUTING SERVICES AND CUSTOMER TESTING - DEVELOPMENT SYSTEM	67 d	Wed 12/23/15	Mon 3/21/16
70	DCO TESTING - DEVELOPMENT SYSTEM	32 d	Wed 12/23/15	Fri 2/12/16
79	AGENCY AND DCO TEST PERIOD - DEVELOPMENT SYSTEM	30 d	Wed 12/23/15	Wed 2/10/16
85	FULL DISASTER RECOVERY TEST	6 d	Fri 2/12/16	Mon 2/22/16
86	POST-DISASTER RECOVERY AGENCY TESTING	20 d	Mon 2/22/16	Mon 3/21/16
87	SYSTEM READY FOR FINAL MIGRATION (NPARC #2)	0 d	Mon 3/21/16	Mon 3/21/16
88	FINAL DATA MIGRATION (NPARC #2) - DEVELOPMENT SYSTEM	3 d	Mon 3/21/16	Thu 3/24/16
95	DEINSTALL RETIRED DEVELOPMENT SYSTEM	7 d	Thu 4/7/16	Mon 4/18/16
99	PRODUCTION SYSTEM (DRBC)	115.15 d	Mon 11/2/15	Fri 4/22/16
100	PROD SYSTEM INSTALLATION	39.15 d	Mon 11/2/15	Tue 1/5/16
101	FACILITY PREPARATION AND PROD SYSTEM INSTALL	39.15 d	Mon 11/2/15	Tue 1/5/16
102	SITE PLANNING - PRODUCTION SYSTEM	24.5 d	Mon 11/2/15	Wed 12/9/15
111	PREPARE COMPUTER ROOM SPACE - PRODUCTION SYSTEM	6 d	Thu 12/10/15	Wed 12/16/15
117	HARDWARE AND OS PREP - PRODUCTION SYSTEM	18.7 d	Tue 12/1/15	Wed 12/30/15
127	ESTABLISH AND TEST BAR PROCESS - PRODUCTION SYSTEM	11.9 d	Thu 12/10/15	Tue 12/29/15
131	VERIFY PROD SYSTEM OPERATIONAL - PRODUCTION SYSTEM	0.6 d	Wed 12/30/15	Mon 1/4/16
136	PRE-NPARC TESTING - PRODUCTION SYSTEM	1.7 d	Wed 12/30/15	Tue 1/5/16
140	TESTING AND MIGRATION - PROD SYSTEM	83.15 d	Tue 11/24/15	Wed 3/30/16
141	TEST PLAN DEVELOPMENT - PRODUCTION SYSTEM	24.6 d	Tue 11/24/15	Tue 1/5/16
146	INITIAL DATA MIGRATION (NPARC#1) - PRODUCTION SYSTEM	24.16 d	Mon 11/30/15	Thu 1/7/16
150	COMPUTING SERVICES AND CUSTOMER TESTING - PRODUCTION SYSTEM	64 d	Thu 1/7/16	Fri 3/25/16
151	DCO TESTING - PRODUCTION SYSTEM	32 d	Thu 1/7/16	Wed 2/24/16
157	AGENCY AND DCO TEST PERIOD - PRODUCTION SYSTEM	20 d	Mon 1/11/16	Tue 2/9/16
163	FULL ARCHIVE FOR DISASTER RECOVERY TEST	2 d	Tue 2/9/16	Thu 2/11/16
164	AGENCY TESTING	30 d	Thu 2/11/16	Fri 3/25/16
165	FINAL DATA MIGRATION (NPARC #2) - PRODUCTION SYSTEM	3 d	Fri 3/25/16	Wed 3/30/16
172	DEINSTALL RETIRED PRODUCTION SYSTEM	7 d	Wed 4/13/16	Fri 4/22/16
176	TEST SYSTEM (2800)	74.65 d	Mon 11/2/15	Thu 2/25/16
177	TEST SYSTEM INSTALLATION	42.65 d	Mon 11/2/15	Fri 1/8/16
178	FACILITY PREPARATION AND TEST SYSTEM INSTALL	42.65 d	Mon 11/2/15	Fri 1/8/16
179	SITE PLANNING - TEST SYSTEM	19.5 d	Mon 11/2/15	Wed 12/2/15
188	PREPARE COMPUTER ROOM SPACE - TEST SYSTEM	6 d	Wed 12/2/15	Wed 12/9/15
194	HARDWARE AND OS PREP - TEST SYSTEM	22.7 d	Tue 12/1/15	Wed 1/8/16
204	VERIFY SYSTEM OPERATIONAL - TEST SYSTEM	0.6 d	Wed 1/8/16	Thu 1/7/16
206	PRE-RELEASE TESTING - TEST SYSTEM	1.7 d	Wed 1/8/16	Fri 1/8/16
213	TESTING AND MIGRATION - TEST SYSTEM	74.86 d	Mon 11/2/15	Thu 2/25/16
214	COMPUTING SERVICES AND CUSTOMER TESTING - TEST SYSTEM	74.86 d	Mon 11/2/15	Thu 2/25/16
215	DCO TESTING - TEST SYSTEM	32 d	Fri 1/8/16	Thu 2/25/16
220	ESTABLISH AND TEST BAR PROCESS - TEST SYSTEM	44.86 d	Mon 11/2/15	Tue 1/12/16
226	DEINSTALL RETIRED TEST SYSTEM	7 d	Tue 1/12/16	Fri 1/22/16
230	POST IMPLEMENTATION SERVICES	20 d	Thu 3/24/16	Thu 4/21/16

Project: MI DW Preliminary Plan
Date: Thu 7/30/15

Task

Milestone

Summary

Rolled Up Task

Rolled Up Milestone

Rolled Up Progress

Split

External Task

Project Summary

Group By Summary

Inactive Task

Inactive Milestone

Inactive Summary

Manual Task

Duration-only

Manual Summary Rollup

Manual Summary

Start-only

Finish-only

Progress

Deadline